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Compounding Ingredients[1]

Compositions—Properties—Functions

THE first installment of this article describing the technical characteristics of vulcanization accelerators was received with hearty approval on the part of rubber chemists and compounders generally. The chemical data which will be published in this series of articles are presented in simple and orderly arrangement that permits quick and easy reference and direct comparisons between the various materials.

The present installment completes the catalog of organic accelerators. Next month antioxidants will be described.

Rubber Chemicals—Organic Accelerators

C-P-B

CHEMICAL NAME. Dibutyl xanthic disulphide.
SELLER. Naugatuck Chemical.
APPLICATIONS. Self-curing or fast-curing cements. Specialties to be vulcanized at low temperatures.
PHYSICAL STATE. Reddish-brown thin liquid.
PROPERTIES. Sp. gr., 1.17. Slight aromatic odor. Stable. Non-toxic. Disperses readily. Non-staining. No scorching tendency in absence of activators.
RELEVANT MATERIALS. Activated by amines and zinc oxide. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Ultra-fast to slow curing, depending upon temperature.
METHODS OF USE. Master batching not necessary.
VULCANIZATION. From room temperature up.
PATENTS. Not disclosed.

Crylene

CHEMICAL NAME. Reactive product of acetaldehyde and aniline.
SELLER. Naugatuck Chemical.
APPLICATIONS. Calendered sheets, extruded products, molded mechanical specialties, and hard rubber.
PHYSICAL STATE. Pulverized brown resin.
PROPERTIES. Sp. gr., 1.12. Melting range, 65 to 68° C. (149 to 155° F.). Imparts slight aromatic odor to cured rubber. Stable. Non-toxic. Non-scorching. Stains during cure. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Good aging and heat resistance. Slow, broad range cures.
METHODS OF USE. Add directly to rubber. Master batching not necessary.
VULCANIZATION. Minimum 35 pounds' steam pressure, 139° C. (282° F.).
PATENTS. Not disclosed.

D-B-A

CHEMICAL NAME. Dibenzylamine.
SELLER. Naugatuck Chemical.
APPLICATIONS. With C-P-B or Z-B-X for self- and fast-curing cements, also specialties.
PHYSICAL STATE. Thin reddish-brown liquid.
PROPERTIES. Sp. gr., 1.018. Odor in cured rubber slightly aromatic. Stable. Non-toxic. Non-staining in rubber.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded by clays and carbon black. Co-accelerator for C-P-B and Z-B-X.
PURPOSE AND FUNCTION. Excellent aging effect. Low temperature cures.
METHODS OF USE. Add directly to the rubber. Mix and handle as usual.
VULCANIZATION. Slow or fast curing when used with C-P-B or Z-B-X according to heat from room temperature up.
PATENTS. Not disclosed.

Di-Esterex

CHEMICAL NAME. Not disclosed.
SELLER. Naugatuck Chemical.
APPLICATIONS. Tire carcass, calendered sheets, footwear, extruded products, and molded mechanical specialties.
PHYSICAL STATE. Yellow powder.
PROPERTIES. Sp. gr., 1.22. Melting range, 120 to 121° C. (248 to 250° F.). Odor unnoticeable. Stable. Non-toxic. Stains white stocks slightly yellow. Dispersion preferably by master batching.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded slightly by clays and carbon black.
PURPOSE AND FUNCTION. Semi-rapid cures. Non-scorching. Aging, heat, and flexing values.
METHODS OF USE. Master batch for addition to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 35 pounds' steam pressure, 131° C. (268° F.), also air cures at 118° C. (245° F.).
PATENTS. Not disclosed.

Di-Esterex N

CHEMICAL NAME. Not disclosed.
SELLER. Naugatuck Chemical.
APPLICATIONS. Tire carcass, extruded products, calendered sheets, and molded mechanical specialties.
PHYSICAL STATE. Yellow powder.

[1] Continued from INDIA RUBBER WORLD, Jan. 1, 1935, pp. 31-34.

PROPERTIES. Sp. gr., 1.24. Melting range, 74 to 88° C. (165 to 190° F.). Odor, none. Stable. Non-toxic. Dispersion by master batching.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Semi-rapid accelerator particularly suited to air cures. Non-scorching.
METHODS OF USE. Master batched for addition to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. Not disclosed.

D.O.T.G.

CHEMICAL NAME. Di-ortho-tolylguanidine.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Heels, soles, footwear, high gravity mechanicals, except white stocks, hard rubber.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.10. M. p., 171° C. (340° F.). Odorless. Non-hygroscopic. Stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 3 to 5% and very strongly by Captax and moderately by Acrin, Thionex, and alkali reclaim. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Exceptionally high modulus. Moderately long range. Medium critical temperature. Fair aging. Fairly active. Reasonably non-scorching. Economical with reclaims.
METHODS OF USE. May be added directly to the rubber or by master batch. Mix and handle with reasonable care as to cooling.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. U. S. No. 1,721,057, owned by du Pont.

D.O.T.T.U.

CHEMICAL NAME. Di-ortho-tolylthiourea.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Formerly used in footwear and mechanicals. Rarely used today.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.25. M. p., 146° C. (295° F.). Pungent odor. Slightly soluble in rubber; insoluble in water. Non-hygroscopic. Stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 5%. Recommend stearic acid 1%; sulphur 5 to 6%. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. High modulus. Short range. Low critical temperature. Poor aging. Very scorchy. Blooms. Does not discolor light stocks.
METHODS OF USE. Master batching recommended. Keep mixing rolls cool. Stocks should be well cooled before storing.
VULCANIZATION. Minimum 25 pounds' steam pressure, 130° C. (267° F.).
PATENTS. Licensed under U. S. No. 1,356,495, owned by The Goodyear Tire & Rubber Co.

D.P.G.

CHEMICAL NAME. Diphenyl guanidine.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Heels, soles, footwear, mechanicals, and molded goods, except white stocks, hard rubber.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.13. M. p., 144° C. (291° F.). Odorless. Non-hygroscopic. Very stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 3 to 5%. Stearic acid 1%. Retarded by clay and carbon black. Neutral to alkali reclaim. Secondary accelerator with acid accelerators such as Thionex, Acrin, Captax, and Ureka.
PURPOSE AND FUNCTION. High modulus. Fairly long range. Moderately active. Medium critical temperature. Fair aging. Somewhat scorchy.
METHODS OF USE. Master batching recommended. Keep mixing rolls cool. Stock should be well cooled before storing.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. U. S. Nos. 1,784,442 and 1,727,093.

E.A.

CHEMICAL NAME. Ethylidene aniline.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Mechanical goods, friction stocks, hard rubber, and high reclaim stocks.
PHYSICAL STATE. Viscous liquid.
PROPERTIES. Sp. gr., 1.12. Characteristic pungent aromatic odor. Stable. Non-toxic. Disperses readily. Discolors white and light colored goods.
RELEVANT MATERIALS. Activated by zinc oxide 5%. Retarded by clay and carbon black. Sulphur 3 to 5% recommended.
PURPOSE AND FUNCTION. Moderately rapid curing, non-scorching with reasonable care, gives medium modulus.
METHODS OF USE. Add directly to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. Not disclosed.

Formaldehyde Aniline

CHEMICAL NAME. Formaniline (formaldehyde aniline).
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Molded goods and tires, except white stocks.
PHYSICAL STATE. Yellowish-white powder.
PROPERTIES. Sp. gr., 1.14. Melting range, 133° C. (271° F.). Slight odor in uncured stocks. Soluble in rubber; insoluble in water. Non-hygroscopic. Turns yellowish-brown when exposed to heat or sunlight. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated slightly by zinc oxide. Activates D.P.G. and reduces scorching. Retarded by clay and carbon black. Retards Acrin and Captax. Recommend stearic acid 1%, and sulphur about 4%.
PURPOSE AND FUNCTION. Medium modulus. Fairly long range. Non-scorching. Secondary accelerator for D.P.G. and acidic types, giving mild acceleration and non-scorching.
METHODS OF USE. Add directly to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 40 pounds' steam pressure, 141° C. (287° F.).
PATENTS. Not disclosed.

Formaldehyde-para-toluidine

CHEMICAL NAME. Formaldehyde-para-toluidine.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Tires, air bags, heels, soles, and high gravity mechanicals.
PHYSICAL STATE. Yellowish-white to grayish-white powder.
PROPERTIES. Sp. gr., 1.11. M. p., 133° C. (271° F.). Somewhat volatile and slight odor in cured rubber. Soluble in rubber; insoluble in water. Non-hygroscopic. Chemically stable, but color darkens when exposed to light. Non-toxic. Master batch dispersion.
RELEVANT MATERIALS. Activated by zinc oxide 3 to 5%. Sulphur 4.5 to 5%. Recommend 1% stearic acid. Retarded by clays and carbon black. As secondary accelerator, it accelerates acid accelerators.
PURPOSE AND FUNCTION. High modulus and firmness in heavily loaded stocks. Slow curing. High temperature. Non-scorching and renders acid accelerators non-scorching. Good aging.
METHODS OF USE. Add in master-batch form. Mix and handle as usual.
VULCANIZATION. Minimum 40 pounds' steam pressure, 141° C. (287° F.).
PATENTS. Not disclosed.

Guantal

CHEMICAL COMPOSITION. The salt or ester formed by reacting 2 molecules of diphenyl guanidine and one molecule of phthalic acid. It contains ½-molecule of water of crystallization.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Excellent for truck tire carcass stocks and air cured sheet stocks, when used with Ureka C.
PHYSICAL STATE. Bluish-white to faintly gray powder.
PROPERTIES. Sp. gr., 1.20. M. p., not below 178° C. (352° F.). Flash point, above 121° C. (250° F.). Soluble in alcohol; insoluble in benzole and gasoline. Odorless. Non-hygroscopic.
RELEVANT MATERIALS. Ureka, Ureka Blend B, Ureka C.
PURPOSE AND FUNCTION. Principally an activator for the Ureka-type accelerators. Used in a fixed ratio in Ureka Blend B. Increased amounts of Guantal and decreased amounts of Ureka C can be used with safety during processing.
METHODS OF USE. Master batching recommended. Keep mixing roll cool. Stock should be well cooled before storing.

VULCANIZATION. Minimum 20 pounds' steam pressure, 125° C. (258° F.). Some Ureka Blend B combinations give air cure.
PATENTS. Not disclosed.

Hepteen

CHEMICAL COMPOSITION. Heptaldehyde-aniline condensation product 20% and light spindle oil 80%. Milder action than Hepteen Base, which see for other details.

Hepteen Base

CHEMICAL COMPOSITION. Heptaldehyde-aniline condensation product.
SELLER. Naugatuck Chemical.
APPLICATIONS. Tire carcass, extruded products, calendered sheets, molded mechanical specialties, air cures, hard rubber, inner tubes, and white tire sidewalls.
PHYSICAL STATE. Dark brown thin liquid.
PROPERTIES. Sp. gr., 0.937. Slight aromatic odor. Stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide and by amines, thiazoles, and thiurams. Retarded by clay and carbon black and not suitable where large quantities of these are used.
PURPOSE AND FUNCTION. Semi-rapid cure. Excellent aging and heat resistance. Practically non-staining.
METHODS OF USE. Add directly to the rubber. Mix and handle as usual.
VULCANIZATION. Minimum 35 pounds' steam pressure, 140° C. (285° F.).
PATENTS. Not disclosed.

Hexa

CHEMICAL NAME. Hexamethylene tetramine.
SELLER. R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Formerly much used in tire carcass and mechanical stocks.
PHYSICAL STATE. White powder.
PROPERTIES. Specific gravity and melting range not determined. Decomposes with heat. Hygroscopic; should be stored in closed containers. Causes skin irritation in many individuals. Does not stain or discolor rubber. Fair rate of dispersion in rubber. Not very active at low temperatures of cure. Gives slight amine odor that becomes bad when litharge is present. Little danger of scorching.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded normally by clay and carbon black. No effect by secondary accelerators. High percentage of sulphur recommended.
PURPOSE AND FUNCTION. Delayed acceleration.
METHODS OF USE. Not commonly used. Master batching desirable, but not indispensable. Mix and handle as usual.
VULCANIZATION. Minimum 40 pounds' steam pressure, 141° C. (287° F.).
PATENTS. Not disclosed.

Methylene Dianilide

CHEMICAL NAME. Methylene dianilide.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Secondary accelerator for guanidines chiefly in molded goods, except white stocks.
PHYSICAL STATE. Yellowish-white, mealy solid.
PROPERTIES. Sp. gr., 1.15. Melting range, 45° C. (113° F.). Odor penetrating, but not unpleasant. Gives off vapors in mixing, irritating but not injurious, to the eyes. Soluble in rubber; insoluble in water. Non-hygroscopic. Stable. Somewhat toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide although not essential. Sulphur about 4%. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Medium modulus. Very long range. Fair aging. Non-scorching. Use only in blooming stocks. Seldom used alone. Secondary accelerator for guanidine.
METHODS OF USE. Add directly to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 40 pounds' steam pressure, 141° C. (287° F.).
PATENTS. Not disclosed.

Monex (Compare Thionex)

CHEMICAL NAME. Tetramethyl-thiuram-monosulphide.
SELLER. Naugatuck Chemical.
APPLICATIONS. Molded mechanical specialties, extruded products, wire insulation, soles, also white, light colored, and transparent products and air cured goods.
PHYSICAL STATE. Yellow powder.
PROPERTIES. Sp. gr., 1.401. Melting range, 105 to 110° C. (221 to 230° F.). Stable. Non-toxic.
RELEVANT MATERIALS. Activated by zinc oxide. Works well with clay and carbon black.
PURPOSE AND FUNCTION. Low-temperature high-speed acceleration with delayed action at start of cure. Non-staining. Good for stocks of all colors. Non-scorching with reasonable precaution. Good aging and heat resistance.
METHODS OF USE. Master batch recommended. Add at early stage of mix and withhold sulphur until close of mixing period. Cool slabs thoroughly before storing.
VULCANIZATION. Minimum 100° C. [212° F. (boiling water)].
PATENTS. Not disclosed.

Novex

CHEMICAL NAME. Bis-benzal-dimethyl-dithiocarbamate.
SELLER. Naugatuck Chemical.
APPLICATIONS. Footwear, extruded products, calendered sheets, proofing.
PHYSICAL STATE. Gray-white powder.
PROPERTIES. Sp. gr., 1.365. Melting range, 174 to 183° C. (345 to 361° F.). Odor, none. Stable. Non-toxic. Dispersion by master batch advisable.
RELEVANT MATERIALS. Activated by zinc oxide and carbon black. Not retarded by clay.
PURPOSE AND FUNCTION. Rapid acceleration. Good aging and heat resistance.
METHODS OF USE. Master batching recommended for dispersion. Cool stock before storing.
VULCANIZATION. Minimum 30 pounds' steam pressure, 174° C. (274° F.).
PATENTS. Not disclosed.

Phenex

CHEMICAL COMPOSITION. Not disclosed. Comparable to the aldehyde amine class, but distinctly different in nature.
SELLER. The C. P. Hall Co.
APPLICATIONS. Mechanical goods and molded specialties.
PHYSICAL STATE. Clear amber liquid.
PROPERTIES. Sp. gr., about 1.12. Stable. Non-toxic. Disperses readily in rubber.
RELEVANT MATERIALS. Activated by zinc oxide and MODX. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Good aging effect. Non-scorching.
METHODS OF USE. Add directly to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. Not disclosed.

Pip-Pip (See Accelerator 552)

CHEMICAL NAME. Piperidine-pentamethylene-dithio-carbamate.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Curing latex, self-curing cements, repair materials, and sheet goods.
PHYSICAL STATE. Fluffy cream colored powder.
PROPERTIES. Sp. gr., 1.13. Melting point, 160° C. (320° F.) approximately. Water soluble. Decomposes slowly in presence of moisture. Keep in airtight containers. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 2 to 5%; also by Thionex, Acrin, and Captax. Retarded by rosin. Barak aids solubility and stability in water solution for latex work. Sulphur 1½ to 2%.
PURPOSE AND FUNCTION. Gives good aging and low modulus. Does not stain. Low critical temperature. Very fast for self-curing and continuous vulcanization.
METHODS OF USE. Split-batch method preferred. Very scorchy. Keep mill temperatures low. Mix only in quantities as needed.
VULCANIZATION. From room temperature up.
PATENTS. Not disclosed.

Pipsolene

CHEMICAL COMPOSITION. Essentially the reaction product of carbon bisulphide and methylene dipiperidine prepared in a form that will emulsify readily in water, latex, or concentrated ammonium hydroxide.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Accelerator for latex.
PHYSICAL STATE. Clear red-brown liquid.
PROPERTIES. Sp. gr., 1.02. Flash point, 40° C. (105° F.).

Forms stable emulsions with warm distilled water, latex, and ammonium hydroxide. Disperses readily as an emulsion in latex.

RELEVANT MATERIALS. Activated by zinc oxide.

PURPOSE AND FUNCTION. Low temperature. Ultra-accelerator for latex.

METHODS OF USE. Emulsify by adding an equal volume of concentrated ammonium hydroxide and then diluting with an equal volume of water. The mixture is then added to latex by stirring.

VULCANIZATION. Minimum 5 pounds' steam pressure, 109° C. (227° F.).

PATENTS. Not disclosed.

R-2

CHEMICAL COMPOSITION. Essentially the reaction product of carbon bisulphide and methylene dipiperidine, blended to constant strength by admixture of a neutral inactive agent.

SELLER. The Rubber Service Laboratories Co.

APPLICATIONS. Self-curing naphtha cements, etc.

PHYSICAL STATE. Clear light-brown liquid.

PROPERTIES. Sp. gr., 0.97. Flash point, 39.5° C. (105° F.). Disperses readily in rubber.

RELEVANT MATERIALS. Activated by zinc oxide.

PURPOSE AND FUNCTION. Low-temperature high-speed accelerator.

METHODS OF USE. Add to the rubber in split batch. R-2 in one half and sulphur in the other. Equal amounts of each batch can then be placed in a drum with naphtha to produce vulcanizing cements. Only enough cement should be prepared at one time to last not over 24 hours.

VULCANIZATION. Room temperature.

PATENTS. Not disclosed.

R & H 50-D

CHEMICAL COMPOSITION. Acetaldehyde-aniline condensation product.

SELLER. E. I. du Pont de Nemours & Co., Inc.

APPLICATIONS. In dark stocks only. Hose, tubing, thread, insulated wire.

PHYSICAL STATE. A fine brown resinous powder.

PROPERTIES. Sp. gr., 1.15. Softens at 60° C. (140° F.). Characteristic aromatic odor. Insoluble in water. Non-hygroscopic. Very stable. Non-toxic. Disperses readily in rubber. Has antioxidant properties. Discolors rubber.

RELEVANT MATERIALS. Activated by D.P.G., Acrin, and Thionex. Retarded by clay and high carbon black loading. Recommend 1% stearic acid; 5% zinc oxide; and 3½% to 4½% sulphur.

PURPOSE AND FUNCTION. Long-range cure and low modulus. Unusually good aging and electrical properties. Exceptionally non-scorching.

METHODS OF USE. Add directly to the rubber. Mix and handle as usual.

VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).

PATENTS. Not disclosed.

SPDX

CHEMICAL COMPOSITION. Lead salt of a complex organic compound.

SELLER. The C. P. Hall Co.

APPLICATIONS. Tires, tubes, molded mechanicals.

PHYSICAL STATE. Fine reddish-brown powder.

PROPERTIES. Sp. gr., about 1.60. Stable. Non-toxic. Discolors white and light colored stocks. Dispersion by master batching. Fugitive type accelerator.

RELEVANT MATERIALS. Activated by stearic acid. Not retarded by clays and carbon black. Recommended to be used with Phenex for fast curing.

PURPOSE AND FUNCTION. High or low temperature curing. Good aging. Medium to high modulus. In conjunction with Phenex is economical for high temperature cures.

METHODS OF USE. Master batching recommended.

VULCANIZATION. Minimum 20 pounds' steam pressure, 125° C. (278° F.).

PATENTS. Not disclosed.

Super-Sulphur No. 1

CHEMICAL COMPOSITION. Zinc dimethyl-dithio-carbamate on clay base.

SELLER. R. T. Vanderbilt Co.

APPLICATIONS. Spread goods and miscellaneous specialties.

PHYSICAL STATE. Gray to white powder.

PROPERTIES. Sp. gr., 2.50. Insoluble in water and organic solvents. Odorless. Stable. Non-toxic. Active at low temperatures.

RELEVANT MATERIALS. Activated by zinc oxide. Usually about 4% of Super-Sulphur required on the rubber.

PURPOSE AND FUNCTION. Active at milling and tubing temperatures and therefore liable to scorch unless precautions are taken. Cements will set or form a jelly at room temperature although the time required depends on the solvent. Benzol cements gel quickly; whereas gasoline cements will keep for days or even weeks before gelling.

METHODS OF USE. To prevent scorching when mixing it is desirable to use split batches; that is, the batch should be split into 2 parts with the accelerator in one part and the sulphur in the other. Each part is separately weighed out and mixed. Both parts, after mixing, should then be allowed to cool before finally mixed together to form the complete compound.

VULCANIZATION. Minimum, room temperature.

PATENTS. U. S. No. 1,513,122.

Super-Sulphur No. 2

CHEMICAL COMPOSITION. Lead dimethyl-dithio-carbamate on a clay base.

SELLER. R. T. Vanderbilt Co.

APPLICATIONS. Mechanical goods, brake lining, footwear, spread goods, and auto topping where it is desired to retain the use of litharge.

PHYSICAL STATE. Gray to white powder.

PROPERTIES. Sp. gr., 2.50. Stable. Non-toxic. Non-scorching. Disperses readily in rubber. Discolors cured rubber.

RELEVANT MATERIALS. Activated by litharge in amount usually double that of the Super-Sulphur, i.e., not less than 8%. Zinc oxide in addition is not required, but is recommended.

PURPOSE AND FUNCTION. Ultra-accelerator. Limited to black or tan goods because of presence of lead. For dry heat, press, or open steam cures.

METHODS OF USE. Add directly to the rubber. Mix and handle as usual.

VULCANIZATION. Minimum 22 pounds' steam pressure, 127° C. (261° F.).

PATENTS. U. S. No. 1,513,122.

Tepidone

CHEMICAL COMPOSITION. Sodium salt of dibutyl-dithio-carbamic acid, 60% in water solution.

SELLER. E. I. du Pont de Nemours & Co., Inc.

APPLICATIONS. Accelerator in latex only.

PHYSICAL STATE. Liquid.

PROPERTIES. Sp. gr., 1.1. Water soluble and may be added directly to latex. Odorless. Stable. Does not discolor rubber.

RELEVANT MATERIALS. Activated by Thionex, 833, D.P.G., D.O.T.G., and Barak. Will cure with 1% zinc oxide or more. Sulphur 1¼ to 2% recommended. Not retarded by usual latex compounding ingredients.

PURPOSE AND FUNCTION. Fast curing low modulus. Ultra-accelerator for latex. Has slight thickening effect on latex, and mixtures may cure in storage. Gives good aging properties.

METHODS OF USE. Add directly in latex, usually about 1% on the rubber content. Addition of good antioxidant is advised.

VULCANIZATION. Minimum 82° C. (180° F.).

PATENTS. Not disclosed.

Tetrone-A

CHEMICAL NAME. Di-pentamethylene-thiuram-tetrasulphide.

SELLER. E. I. du Pont de Nemours & Co., Inc.

APPLICATIONS. Accelerator for sulphur-free stocks and Performite-type insulated wire.

PHYSICAL STATE. Grayish-yellow powder.

PROPERTIES. Sp. gr., 1.405. M. p., not below 45° C. (112° F.). Very slightly soluble in water. Odorless in rubber. Stable. Non-toxic. Does not discolor white stocks, or pyroxylin, or tarnish metals. Disperses readily in rubber.

RELEVANT MATERIALS. Activated strongly by zinc oxide 5%. Retarded by clay, carbon black, and lead oleate. Recommend addition of 1% stearic acid. Tetrone-A contains 23% sulphur available for vulcanization; therefore none need be added.

PURPOSE AND FUNCTION. Wide range fast cures without sulphur. Low modulus. Exceptionally high aging and heat resistance. Used with Thionex for sulphur-free stocks.

METHODS OF USE. Add directly to rubber with or without master batching. Fairly safe accelerator in no-sulphur stocks, but too scorchy to handle when sulphur is added.

VULCANIZATION. Fast curing. Wide range of cure when used without sulphur.
PATENTS. U. S. Nos. 1,634,925 and 1,681,717.

Thio

CHEMICAL NAME. Thiocarbanilide.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Quick-curing cements and latex. Formerly used extensively in tire stocks, tubes, mechanicals, etc., but has been largely replaced by other chemicals.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.32. M. p., 150° C. (302° F.). Flash point, 141° C. (286° F.). Insoluble in water and common solvents except alcohol. Slightly toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide. With R-2 and Pipsolene it cures very fast at low temperatures.
PURPOSE AND FUNCTION. High modulus characteristics. Quick low-temperature curing. Short range and progressive curing effects.
METHODS OF USE. Add directly to batch after compounding. Sulphur last. Keep mill temperature low. Very scorchy. Cool mixed slabs well before storing.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. Not disclosed.

Thiocarbanilide (Thio)

CHEMICAL NAME. Thiocarbanilide.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Formerly used in heels, soles, footwear, and mechanicals.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.28. M. p., 128° C. (299° F.). Irritating fumes liberated during mixing. Slightly soluble in rubber. Slightly toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 5%. Sulphur 3½ to 4%. Recommend 1% stearic acid. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Gives high modulus and progressive curing. Poor aging. Largely displaced by improved accelerators.
METHODS OF USE. Master batching recommended. Add near close of mixing period. Very scorchy. Keep mill temperatures low. Cool slab thoroughly before storing.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. Not disclosed.

Thionex (Compare Monex)

CHEMICAL NAME. Tetramethyl-thiuram-monosulphide.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Molded mechanical specialties, dry heat cured rubberized fabrics, sponge, heels and soles, insulated wire, druggists' sundries. Secondary accelerator for Acrin and D.O.T.G.
PHYSICAL STATE. Lemon yellow powder.
PROPERTIES. Sp. gr., 1.39. M. p., 107° C. (225° F.). Very slightly soluble in water. Does not discolor white stocks or give odor. Stable. Non-volatile. Non-toxic. Disperses readily in rubber.
RELEVANT MATERIALS. Maximum activation by 5% zinc oxide. Active in pure gum type stocks with 1% or less of zinc oxide. Also activated by D.P.G., Acrin, Captax, and Barak. Retarded by clay, carbon black, litharge, and Antiscorch T. Recommend 1% stearic acid and 1¾ to 2¼% sulphur.
PURPOSE AND FUNCTION. Delayed action at low temperatures safeguards scorching. Fast curing. Low modulus. High-Thionex-low-sulphur combinations for superior aging and heat resistance.
METHODS OF USE. Add in master batch because of small amount used.
PATENTS. U. S. No. 1,400,964.

T.P.G.

CHEMICAL NAME. Triphenyl guanidine.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. High gravity stocks such as heels, soles, molded specialties, and mechanicals, except white stocks.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.10. M. p., 141° C. (287° F.). Odorless. Slightly soluble in rubber. Non-hygroscopic. Stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 2 to 3%. Activates acidic accelerators. Retarded by clays and carbon black.
PURPOSE AND FUNCTION. High modulus. Very long range. Moderately fast. High critical temperature. Non-scorching.
METHODS OF USE. Add directly to rubber. Mix and handle as usual.
VULCANIZATION. Minimum 40 pounds' steam pressure, 141° C. (287° F.).
PATENTS. Not disclosed.

Trimene

CHEMICAL COMPOSITION. Tri-ethyl-trimethylene-triamine 55%, stearic acid 45%.
SELLER. Naugatuck Chemical.
PHYSICAL STATE. Heavy paste.
PROPERTIES. Sp. gr., 1.027.
See Trimene Base for other details. Trimene, of course, is milder in its action.

Trimene Base

CHEMICAL NAME. Tri-ethyl-trimethylene-triamine.
SELLER. Naugatuck Chemical.
APPLICATIONS. All air cured goods, molded sundries, and mechanicals.
PHYSICAL STATE. Heavy liquid.
PROPERTIES. Sp. gr., 1.142. No odor. Slightly discolors rubber. Stable. Non-toxic ordinarily. When used in spreading doughs, the solvent present may irritate hands because of its alkaline nature. Disperses readily in rubber.
RELEVANT MATERIALS. Activated by zinc oxide, also by thiurams and thiazoles. Retarded slightly by clay and carbon black. U-T-B recommended as retarder when one is required.
PURPOSE AND FUNCTION. Medium fast broad curing range. Exceptionally good aging.
METHODS OF USE. Add directly to the rubber. Mix and handle as usual.
VULCANIZATION. Minimum air cures 124° C. (255° F.). Mold and steam cures 30 pounds' steam pressure, 134° C. (274° F.).
PATENTS. Not disclosed.

Tuads

CHEMICAL NAME. Tetramethyl-thiuram-disulphide.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. As vulcanizing agent—air bags, hot water bags, and heat resisting mechanicals, insulated wire, etc. As secondary accelerator with Captax or Altax—tires, tubes, footwear, clothing, all kinds of low-sulphur stocks.
PHYSICAL STATE. Grayish-white powder.
PROPERTIES. Sp. gr., 1.29. M. p., 140 to 145° C. (284 to 293° F.). Insoluble in water, aqueous acids or alkalis and gasoline. Moderately soluble in alcohols, acetone, ether, and benzol. Freely soluble in chloroform, ethylene dichloride, and tetrachlorethane. Odorless. Stable.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded by litharge. Captax or Altax may be used to improve effect of Tuads and also to retard cure at low temperatures. Used alone with sulphur the amount of Tuads required is 0.1 to 1% on the rubber with 3 to 1% of sulphur.
PURPOSE AND FUNCTION. Unique vulcanizing agent, and ultra-accelerator with low sulphur for heat resistance, super-aging, non-tarnishing to metals, and electrical resistance. Secondary accelerator with Captax and Altax to shorten cure and boost modulus.
METHODS OF USE. As primary accelerator, should be master batched 10%, and sulphur added last to the mix. Some care required in handling, cooling, and storing the uncured stocks.
PATENTS. U. S. Nos. 1,413,172 and 1,558,707.

Ulto

CHEMICAL COMPOSITION. Zinc salt of a complex di-thio-carbamate.
SELLER. The C. P. Hall Co.
APPLICATIONS. Ultra-accelerator for cements and pure gum or compounded stocks.
PHYSICAL STATE. Fine cream-colored powder.
PROPERTIES. Sp. gr., about 1.50. Stable. Non-toxic. Does not discolor rubber. Dispersed by master batching.
RELEVANT MATERIALS. Retardex may be used with Ulto to prevent scorching. Sulphur required 2 to 3%.
PURPOSE AND FUNCTION. Ultra-accelerator at low temperatures for cements and pure gum stocks. High modulus and good aging quality.
METHODS OF USE. Master batching necessary. Mix and handle with care to keep cool.
VULCANIZATION. Minimum 100° C. (212° F.).
PATENTS. Not disclosed.

Ureka

CHEMICAL COMPOSITION. A constant blend of diphenyl guanidine and 2-4 dinitro-phenyl-benzothiazole.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Tire carcass, footwear, extruded products, heels, soles, calendered sheets, druggists' sundries.
PHYSICAL STATE. Light yellow powder.
PROPERTIES. Sp. gr., 1.25. Melting range, 117 to 127° C. (243 to 261° F.). Flash point, 173° C. (345° F.). Soluble in alcohol and chloroform. Non-hygroscopic. Stable. Non-toxic.
RELEVANT MATERIALS. Activated by zinc oxide. Retarded initially by acid softeners such as pine tar and stearic acid.
PURPOSE AND FUNCTION. Ultra-accelerator. Mild at start, becoming very powerful when heated in presence of zinc oxide and sulphur. Tendency to scorch. High tensile properties.
METHODS OF USE. Master batching recommended. Milled and calendered stocks to be cooled before rolling to prevent scorching.
PATENTS. Not disclosed.

Ureka Blend B

CHEMICAL COMPOSITION. Blend similar to Ureka with a portion of the D.P.G. replaced by Guantal.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Footwear.
PHYSICAL STATE. Yellow powder.
PROPERTIES. Sp. gr., 1.33. M. p., 130° C. (266° F.). Flash point, 121° C. (250° F.). Stable. Non-toxic. Delayed action semi-ultra-accelerator. Tendency to scorch.
RELEVANT MATERIALS. See Ureka.
PURPOSE AND FUNCTION. Dry heat cure of footwear, etc.
METHODS OF USE. Master batching recommended. Milled and calendered stocks to be cooled before rolling to prevent scorching.
PATENTS. Not disclosed.

Ureka C

CHEMICAL COMPOSITION. An acyl-thiazole powder in which the acidic hydrogen atom of mercapto-benzo-thiazole has been replaced by a benzoyl group. Generally designated as benzo-thiazyl-thiobenzoate.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Can be used in all types of stocks, tire carcass, calendered sheets, extruded products, proofing, molded mechanical specialties, footwear.
PHYSICAL STATE. Pale ivory or yellowish powder.
PROPERTIES. Sp. gr., 1.43. M. p., not below 115° C. (239° F.). Flash point, above 121° C. (250° F.). Readily soluble in chloroform and benzene; slightly soluble in alcohol. Stable in normal storage.
RELEVANT MATERIALS. Activated by zinc oxide. Stearic acid should be present in small amounts in pure gum stocks. Retarded by clay and carbon black. When these are present, addition is recommended of 3% stearic acid on the rubber. With litharge or Oxynone gives good electrical properties. With tetramethyl-thiuram monosulphide produces flat white stocks. With Guantal or D.P.G. produces excellent tensile properties.
PURPOSE AND FUNCTION. High tensile properties. High modulus.
METHODS OF USE. Add to rubber in master batch. Milled and calendered stocks to be cooled before rolling to prevent scorching.
PATENTS. Not disclosed.

Vulcanex

CHEMICAL COMPOSITION. Para-toluidine-acetaldehyde-aniline condensation product.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Tire carcass, calendered sheets, molded mechanical specialties, heels, and stocks containing reclaims.
PHYSICAL STATE. Amorphous, friable, conchoidal fracturing resin.
PROPERTIES. Sp. gr., 1.07. M. p., 80° C. (176° F.). Odor, mild aromatic. Insoluble in water. Very stable. Non-hygroscopic. Non-toxic. Low modulus. Moderately fast curing. Does not scorch readily. Disperses readily.
RELEVANT MATERIALS. Activated by Thionex, Captax, and zinc oxide. Recommended, zinc oxide 5%; stearic acid 1%; and sulphur 3 to 4.5%. Retarded by clay and carbon black.
PURPOSE AND FUNCTION. Moderately fast cure. Excellent aging. Low modulus. Broad range.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Minimum 30 pounds' steam pressure, 134° C. (274° F.) and up.
PATENTS. U. S. Nos. 1,571,739, 1,638,220, and 1,417,970.

Vulcone

CHEMICAL COMPOSITION. Formaldehyde derivative of condensation product of aniline and acetaldehyde.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Tires, tubes, heels, belting, mechanicals where excellent aging and heat resistance are factors.
PHYSICAL STATE. Brown resinous powdery solid.
PROPERTIES. Sp. gr., 1.17. Melts below 75° C. (167° F.). Flash point, 171° C. (340° F.). Low toxicity. Disperses readily.
RELEVANT MATERIALS. Activated by zinc oxide 5%.
PURPOSE AND FUNCTION. Moderately fast acceleration. High heat resistance. Excellent aging.
METHODS OF USE. Add directly to rubber. Mix and handle batch as usual.
VULCANIZATION. Minimum 35 pounds' steam pressure, 139° C. (282° F.).
PATENTS. Not disclosed.

Z-B-X

CHEMICAL NAME. Zinc butyl xanthate.
SELLER. Naugatuck Chemical.
APPLICATIONS. Self-curing cements, cold-patch tube gum, sheet goods.
PHYSICAL STATE. Grayish-white powder.
PROPERTIES. Sp. gr., 1.561. M. p., 110° C. (230° F.). Unstable. Non-toxic. Non-staining. Imparts some odor to vulcanized rubber. Disperses readily.
RELEVANT MATERIALS. Activated by amines. Small amount of zinc oxide recommended.
PURPOSE AND FUNCTION. Room temperature curing. Very scorchy.
METHODS OF USE. Add directly to the rubber in split batch. Z-B-X, rubber, and zinc in one; amine and sulphur in the other. Store separately. Combine the 2 when ready for cure to begin.
VULCANIZATION. At room temperature.
PATENTS. Not disclosed.

Zimate

CHEMICAL NAME. Zinc dimethyl-dithio-carbamate.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Inner tube splicing, fast-curing cements, self-curing stocks, hard rubber, latex, and specialties.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 2.00. M. p., 250° C. (482° F.). Insoluble in water. Sparingly soluble in alcohol, ether, acetone, and chloroform. Odorless. Stable. Non-toxic. Non-discoloring.
RELEVANT MATERIALS. Addition of Altax recommended for retarding rate of cure. Stearic acid retards the cure at low temperatures of stocks containing Zimate or Zimate plus Captax.
PURPOSE AND FUNCTION. Ultra-accelerator for either latex or ordinary rubber mixings. It is comparable in strength to Tuads, but active at lower temperatures. Will not give good cures in absence of sulphur. Cures hard rubber in boiling water.
METHODS OF USE. In dry mixings use split batches or add Altax to batch to raise the critical temperature. Mix with proper cooling precautions to prevent scorching.
VULCANIZATION. Minimum 100° C. (212° F.).
PATENTS. U. S. No. 1,513,122.

(To be continued)

SCREENS FOR "TALKIES." At present perforated rubberized fabrics are employed in "talkie" screens. The fabrics used are a special high-grade muslin which is rubberized and vulcanized in the usual manner in sulphur chloride vapor. Then the material is perforated; the tiny holes with a diameter of about one mm. are arranged in quincunx formation, the individual holes being 3 to 4 mm. apart. The newer style of screens is much more expensive than the older ones chiefly because of the high type of fabric that must be employed and are rendered still more costly by the special finish that is required for maximum luminosity.

Rubber Cements

Joseph Rossman, Ph.D.

THE following abstracts of United States patents conclude the informative and interesting article on rubber cements published in our issue of January 1, 1935.

52. Plasterer, 1,458,308, June 12, 1923. A cement for uniting cloth consists of rubber digested together with commercial rosin and commercial brown shellac into a semi-solid by means of carbon disulphide, and gum-arabic dissolved in benzine, the ingredients digested together to form a thick paste.

53. Cook, 1,467,356, Sept. 11, 1923. An adhesive cement contains the following: pure rubber, 8 pounds; a rubber solvent (benzol), 10 gallons; ground white shellac, ¼-pound; alcohol (180 proof), 6 pints; powdered white rosin, one pound; oil of sassafras, 8 ounces; ether, 8 ounces.

54. Russell, 1,499,752, July 1, 1924. To splice pneumatic tubes cement them together with a rubber cement containing sulphur, zinc oxide, and zinc ethylxanthate or other ultra-accelerator.

55. Farrell, 1,510,591, Oct. 7, 1924. An adhesive comprises refined asphalt, blown mineral oil, and gutta percha.

56. Harris, 1,521,947, Jan. 6, 1925. A tabbing composition consists of 105 parts rubber, 35 parts glue, 10 parts filler, 13 parts calcium carbonate, 6 parts calcium hydroxide.

57. Thieme, 1,527,715, Feb. 24, 1925. Insect-catching glue consists of a solution of chlorinated rubber in chlorinated cotton oil.

58. Respess, 1,533,272, Apr. 14, 1925. An adhesive tape comprises an unwoven fibrous bat saturated with a binding adhesive agent and coated on one side with a medicated adhesive and a waterproofing coating comprising rubber upon the opposite side of the bat.

59. Ellis, 1,544,529, June 30, 1925. A quick drying cement consists of chlorinated rubber in carbon bisulphide, which is used for cementing wood, leather, and other materials.

60. Meyer, 1,545,005, July 7, 1925. To make an elastic adhesive melt and mix below 200° C. a resinous body, a pure fatty acid, and rubber body into a homogeneous mass.

61. Marlett, 1,561,095. Nov. 10, 1925. A cement is composed of a mixture of 3¾ pounds of resin, one pound of coal-tar pitch, ¼-pound of linseed oil, 1½ pounds of vulcanized rubber, and 1½ pounds of 60° Be. test gasoline.

62. Otto, 1,602,200, Oct. 5, 1926. An adhesive for pasting paper together consists of a mixture of 76 parts of benzene, 2 parts of ether, ½-part of solution of ammonia, and ½-part of acetone, in which 21 parts of unvulcanized rubber are dissolved.

63. Geer, 1,617,588, Feb. 15, 1927. Metal is united to vulcanized rubber by a thermo-plastic isomer of rubber formed by the reaction of an intimate mixture of 7½ parts of p-phenol sulphonic acid and 100 parts of rubber heated from 4 to 10 hours at 250 and 290° F.

64. Geer, 1,617,707, Feb. 15, 1927. A laminated sheet has a backing composed mainly of a tacky heat-plastic rubber isomer, and a facing of vulcanized rubber.

65. Zimmerli, 1,626,493, Apr. 26, 1927. A surgical dressing adhesive consists of a heat-sterilized rubber latex emulsion stabilized by ammonia.

66. Blocker, 1,652,926, Dec. 13, 1927. An adhesive for repairing rubber goods comprises 5% of a rubber solution containing 5% of rubber and 95% of naphtha dissolved in equal parts of ether and benzol and 3% chloroform.

67. Davis, 1,654,240, Dec. 27, 1927. A method of preparing layers of rubber for application to surfaces of other material consists in applying upon the contact face of the layer of rubber a solution of rubber, spraying latex upon this layer, and evaporating the moisture from the latex applied, to yield a thin film of rubber over the layer of rubber in solution.

68. Malm, 1,654,297, Dec. 27, 1927. An adhesive comprises rubber 59%, rosin oil 6%, rosin 23%, and asbestos fibers 12%.

69. Loomis, 1,673,573, June 12, 1928. To form fabric seams apply a partially coagulated latex in paste form between superposed fabric edges and press.

70. Ellis, 1,695,637, Dec. 18, 1928. An adhesive comprises a solution of a chlorinated rubber containing over 67% of chlorine, and a solvent therefor such as carbon tetrachloride, carbon bisulphide, and naphtha.

71. Geer, 1,744,880, Jan. 28, 1930. An adhesive comprises an artificial isomer of rubber mixed with a small proportion of organic age resister such as the thiourea of dimethylparaphenylenediamine, 1.8 naphthylenediamine, aldolalphanaphthylamine, and benzidine.

72. Teague, 1,746,875, Feb. 11, 1930. A shoe cement consists of 100 parts rubber by weight as latex containing 33⅓% solids, 20 parts ammonium resinate (dry basis) by weight, 280 parts water (not including that in the latex), 24 parts litharge by weight, 4.2 parts sulphur by weight. In mixing the above a paste is made of the litharge and the sulphur by using the ammonium resinate solution, and the mixture is then added to the latex and stirred well. If a solvent is desired in the compound, 200 parts of solvent naphtha may be added slowly to the previously made latex mixture while it is vigorously stirred. The litharge acts as a thickener and also as a vulcanization accelerator. There may be substituted for the ammonium resinate in the above example 20 parts of the ammonium compound of pine tar.

73. Healy, 1,752,557, Apr. 1, 1930. The process of making cement comprises subjecting crude rubber to a temperature of substantially 330° F. at a pressure of 90 pounds per square inch for a period of 30 minutes, dissolving the so-treated rubber in 70° Be. gasoline, and churning the solution to a smooth consistency.

74. Owen, 1,753,018, Apr. 1, 1930. An adhesive consists of a latex containing dispersed factice.

75. Drew, 1,760,820, May 27, 1930. A sheeted material includes a creped or toweled fabric base and a pressure sensitive adhesive coating on one face thereof. The adhesive consists of 10 pounds of plasticized, first

quality plantation rubber, as clear crepe or smoked sheets, 2 pounds of coumarone gum, and ½-pound of zinc oxide pigment.

76. Biddle, 1,802,866, Apr. 28, 1931. An adhesive comprises glue, rubber latex, and an insolubilizing agent for the glue. The following is a specific example: glue, 15 parts; water, 25 parts. This glue solution is then mixed with rubber latex, 175 parts. To the composition thus formed is added china wood oil, 20 parts; zinc oxide ground in oil, 35 parts; ocher or other pigment or filling material, 20 parts; sulphur, 5 parts; potassium bichromate approximately 20% solution, 6 parts. When the insolubilizing agent, potassium bichromate, is added, the composition is thoroughly agitated to obtain the maximum insolubilizing action and also to prevent local coagulation.

77. Goodenow, 1,821,703, Sept. 1, 1931. To make an elastic cement base of great adhesiveness which may be dissolved in a solvent, intimately mix a finely divided powdered resin gum, as fossil gum, with latex.

78. Ellis, 1,830,428, Nov. 3, 1931. An adhesive for insoles consists of rubber, 65 pounds; zinc oxide, 41 pounds; burgundy pitch, 22 pounds; naphtha, 43 gallons.

79. Levin, 1,852,532, Apr. 5, 1932. An adhesive comprises latex, about 2 pounds; blood albumen, about 8 pounds; and water, about 15 pounds.

80. Warner, 1,869,638, Aug. 2, 1932. A rubber cement consists of dissolved rubber partially brominated.

81. Stille, 1,869,783, Aug. 2, 1932. An adhesive consists of 16 pounds shellac gum, 8 pounds Pontianak gum, 2 pounds titanium oxide, 22 pounds fibrous talc, 22 pounds alcohol.

82. Kemp, 1,882,081, Oct. 11, 1932. An insulating adhesive consists of a polymerized cyclic terpene hydrocarbon, more especially a dipolymer, mixed with gutta percha and balata.

83. Zimmerli, 1,892,123, Dec. 27, 1932. A spreadable adhesive is composed of a plastic dough comprising reclaimed rubber and a resin gum intimately admixed to form a dough of higher plasticity than either of its constituents, which are present in amounts within the range of 50 to 200 parts by weight of reclaimed rubber to 100 parts of resin gum. The dough is dispersed in an organic solvent.

84. Semon, 1,892,167, Dec. 27, 1932. A soft, smooth, permanently plastic material comprises ester gum fluxed with vulcanized rubber in proportions ranging from 40 to 150 parts by weight of vulcanized rubber to 100 parts of ester gum.

85. Grossman, 1,893,939, Jan. 10, 1933. An adhesive solution is composed of rubber and mineral oil boiled together at a temperature of 302° F.

86. Saeger, 1,897,149, Feb. 14, 1933. A paste for cores used in making castings of molten steel, brass, aluminum, and similar high melting point metals contains rubber and a vulcanizing accelerant; the rubber is adapted to be subjected to disintegration by the heat of the cast metal.

87. Hazell, 1,916,421, July 4, 1933. The process of preparing a low viscosity cement comprises plasticizing rubber, mixing thereto ethyl alcohol until a soft dough is formed, and then gradually mixing thereto naphtha until the mass flows freely and spreads smoothly.

88. Gabor, 1,926,524, Sept. 12, 1933. A method of coating aluminum and its alloys with hard rubber consists in treating the surface of the aluminum with hydrochlorine acid, applying a coating of rubber composition to the thus-treated surface, and vulcanizing it thereon.

89. Halloran, 1,926,943, Sept. 12, 1933. A waterproof cement comprises the resultant product of leather with all its tanning agent dissolved in water with added latex and sulphur.

90. Twiss, 1,931,879, Oct. 24, 1933. An adhesive for uniting rubber to metal is obtained as follows. Seventy parts by weight of the semi-fluid resin obtained by extracting crude balata with a light petroleum solvent is admixed with 30 parts by weight of masticated smoked sheet rubber and maintained at 100° C. until a solution results. This solution is then mixed with 10% to 20% of phenol sulphonic acid. After it is stirred well at 100° C. it is heated to 120° to 130° C. in an air oven. After approximately 30 minutes a vigorous reaction takes place accompanied by frothing. The mixture, then removed from the oven, is stirred well. When the frothing begins to subside, the mass is quickly cooled in cold water, and the roughly crushed material is washed to remove excess acid. The dried product is dissolved in a suitable organic solvent, as toluene or carbon tetrachloride, and applied in this form as an adhesive for rubber to metal.

91. Holmberg, 1,932,624, Oct. 31, 1933. To make latex adhesive cream latex, add thereto rosin oil, carbon tetrachloride in emulsion form, and a deodorant, as oil of wintergreen, adapted to mask the ammonia odor.

92. McGavack, 1,932,632, Oct. 31, 1933. An adhesive comprises concentrated acidified latex; material from the group consisting of casein; glue, gelatine, corn gluten, and egg albumen; material from the group consisting of antimony penta sulphide, powdered silica gel, iron oxide, and magnesium oxide; and vulcanizing ingredients including sulphur in excess of the quantity necessary to effect vulcanization.

93. Osmun, 1,933,026, Oct. 31, 1933. An adhesive tape comprises a paper web impregnated with a solution of ammonium mono-phosphate and formaldehyde to which a solution of ethylene glycol mono-ethyl ether acetate, triethanolamine, and diethylene glycol has been added, and a coating of rubber latex on the impregnated web, which has been applied to the web while the latter was still damp from the impregnating solution.

94. Crockett, 1,936,106, Nov. 21, 1933. A process of converting latex into a rubber cement comprises agitating a mixture of rubber latex and a rubber solvent in amount greatly exceeding the latex until the rubber particles have combined with and have been swollen by the solvent to generate a viscous, sticky, continuous mass, including the water content of the latex. The following example is given. To one liter of gasoline 72° Be. are added 200 cubic centimeters of normal latex containing 30% solids and 1.87% ammonia. After agitation of about one hour with a high speed stirrer, the rubber has absorbed the solvent with very gradual thickening and swelling to a viscous mass.

95. Zimmerli, 1,937,861, Dec. 5, 1933. An adhesive cement consists in its unset state mainly of a solution including calcium resinate, rosin, and rubber. The following is an example. One hundred parts by weight of reclaimed inner tubes are mixed with 100 parts of rosin and 5 parts of powdered quick lime. The mixture is thinned with 300 parts of gasoline.

96. MacIver, 1,938,078, Dec. 5, 1933. An adhesive comprises spray dried formaldehyde-treated latex having the rubber thereof dispersed in an aqueous medium, the composition containing a water-soluble soap. The following is an example. One hundred parts of formaldehyde-preserved latex in spray dried form are broken down on a rubber mill in the presence of a softening agent such as about ½-part of a mineral hydrocarbon oil, as spindle oil. Milling is continued for about 45 minutes. If desired, any of the usual compounding in-

gredients may be added to the rubber on the mill and mixed therewith. The rubber compound is then placed in a heated W & P steam jacketed mixer and thoroughly agitated for a short time. Next, about 12 parts of rosin are added, with the mixing continuing. In place of rosin any material adapted to form a soap may be used. Water is then added in small quantities, while the mixing is going on, so that the rubber will take up the water continuously without leaving an unabsorbed amount. The water may be added as a continuous stream or intermittently. When used intermittently, it is preferred to use the water in separate portions of about 4½ parts of water. After about 9 parts of water have been added, about 1½ parts of dry caustic soda are put into the mix, agitating the latter, while heated by the steam jacket of the mixer. The rosin is thereby saponified. To distribute easily the formed soap throughout the mass cooling water is run into the jacket of the mixer after the steam is turned off while the mixing continues. After a short time water is gradually added in separate portions of about 4½ parts of water while the mixing continues until about 75% solids are reached. At this point the rubber passes from the continuous to the disperse phase. Subsequent additions of water, while the mix is agitated, allow of a dilution to any desired concentration. In place of the sodium resinate any of the customary dispersing agents may be used, such as soluble casein, glue, agar-agar, colloidal clays, or the like. For adhesive purposes, however, the alkali-metal soaps of the higher fatty acids are preferred because they interfere less with the tackiness of the final product when dried.

97. Dunfield, 1,943,423, Jan. 16, 1934. The invention consists in treating rubber at elevated temperatures for a considerable period of time sufficient to melt or depolymerize the rubber, thereby changing it into a material having strong adhesive properties when vulcanized. The thus-treated material is mixed with the proper vulcanizing ingredients and as such may be used to unite rubber and metal by vulcanization. In the particular method of preparing the melted rubber, a portion of the rubber, either broken down or unbroken down, is heated in a container preferably closed and having a long reflux. This heating is carried on at a temperature of approximately 300° C. although it may be varied somewhat therefrom, the range of temperature being 180° C. to 300° C. This heating may last for from 10 to 20 hours with successful results although the time found most suitable is approximately 18 hours. To the melted rubber, sulphur either in large or small percentages is added and an appropriate accelerator, such as Heptene Base, which is the condensation product of heptaldehyde and aniline, and zinc oxide are added and mixed in a paint or grinding mill.

98. Dunfield, 1,943,424, Jan. 16, 1934. An adhesive material contains "melted rubber" (see patent 1,943,423) and Newbrough rubber (prepared according to patent 100,435) in the range from 25 parts of "melted rubber" and 75 parts of Newbrough rubber to 75 parts of "melted rubber" and 25 parts Newbrough rubber, and a minor proportion of unmelted rubber.

99. Delaney, 1,945,803, Feb. 6, 1934. A cement consists of equal parts by weight of a chlorinated naphthaline and ester gum and about 5% of latex.

100. Charch, 1,953,104, Apr. 3, 1934. An adhesive adapted to deposit a transparent film and to be used for sealing, joining, or uniting materials having surfaces formed of a composition comprising a cellulose derivative to both similar and dissimilar materials comprises the following ingredients in approximately the following parts by weight: aqueous dispersion of rubber (45% rubber), one part to 15 parts; water-soluble agglutinant, 5 to 50 parts; triethanolamine, 0.5-part to 6 parts; ethyl lactate, one part to 15 parts.

101. Goldmann, 1,956,899, May 1, 1934. A glue contains 3.2 kilos of white crepe rubber, 3.6 kilos of factice, 0.4-kilo of resin, 1.3 kilos of benzene, 5.1 kilos of methylhexalinhydrogenester of the adipic acid, and 10.8 kilos of chalk.

102. Hazell, 1,958,479, May 15, 1934. An adhesive consists of rubber in an organic solvent in admixture with comminuted chrome-tanned leather and vulcanizing ingredients.

103. Healy, 1,966,389, July 10, 1934. A tabbing composition comprises an uncoagulated vulcanized rubber latex, dissolved casein, dissolved albumen, and solid fibrous material, and containing a small amount of free ammonia in solution.

104. Teague, 1,967,336, July 24, 1934. An adhesive composition comprises latex containing free fixed alkali, sodium perborate, and hexamethylenetetramine from the reaction of formaldehyde and ammonia in the latex.

105. Dunham, 1,971,522, Aug. 28, 1934. An adhesive comprises a dispersion of non-acid dried milk and an amide, in an aqueous vehicle, the same being suitable for joining regenerated cellulose films.

NOTE: The following list of patents for cements containing latex has been abstracted in INDIA RUBBER WORLD in the article entitled "Compounding Latex" published in serial form, May, 1932, to December, 1932: Davidson, 1,145,351, July 6, 1915; Slocum, 1,293,957, Feb. 11, 1919, 1,332,926, Mar. 9, 1920; Biddle, 1,437,487, Dec. 5, 1922; Teague, 1,550,466, Aug. 18, 1925; Taylor, 1,566,566, Dec. 22, 1925; Hopkinson, 1,582,219, Apr. 27, 1926; Biddle, 1,607,585, Nov. 16, 1926; Zimmerli, 1,626,493, Apr. 26, 1927; Dewey, 1,627,278, May 3, 1927; Harris, 1,631,265, June 7, 1927; Kelley, 1,644,730, Oct. 11, 1927; McGavack, 1,647,805, Nov. 1, 1927; Day, 1,689,581, Oct. 30, 1928; Wescott, 1,690,150, Nov. 6, 1928; Biddle, 1,691,460, Nov. 13, 1928; Teague, 1,719,948, July 9, 1929; Biddle, 1,722,553, July 30, 1929; Levin, 1,740,184, Dec. 17, 1929; Dewey, 1,745,084, Jan. 28, 1930; Teague, 1,750,767, Mar. 18, 1930; Biddle, 1,762,152 and 1,762,153, June 10, 1930; Dewey, 1,765,134, June 17, 1930; Biddle, 1,777,157 to 1,777,162, incl., Sept. 30, 1930; Mathey 1,784,740, Dec. 9, 1930; Whittelsey, 1,793,983, Feb. 24, 1931; Biddle, 1,801,621, Apr. 21, 1931; Lane, 1,807,244, May 26, 1931; and Hopkinson, 1,808,225, June 2, 1931.

Goodyear Pliofilm

PLIOFILM is made from first-grade rubber and in addition to possessing the advantage of inherent moisture-proofness, has the following characteristic properties. It may be heat sealed although the range of heat sealing must be carefully controlled within a temperature range of from 105 to 130° C. Because of the increase tear resistance and extensibility, it is able to stand more abuse than the usual type of transparent cellulose material.

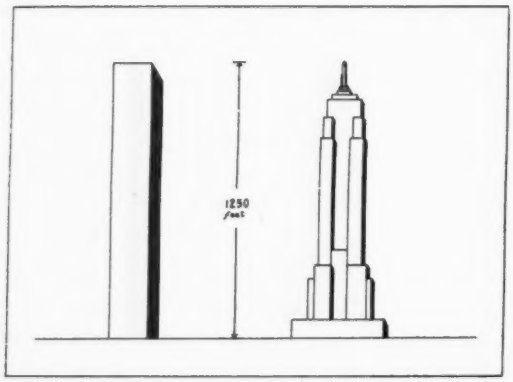
It possesses considerably more stretch than cellulose sheet, which is an advantage in that it prevents puncturing when drawn over sharp corners or other sharp obstacles. It is not affected by changes in humidity. This factor is a decided advantage in handling on machines and also in storage of articles which may be wrapped with it. It is resistant to the action of oils and greases and other materials which are difficult to hold in the usual type of wrapping material.

The tensile strength of Pliofilm is only approximately ½ that for a good grade cellulose sheet. However its shock resistance due to the increase tear resistance and extensibility is considerably greater than transparent materials which are now offered on the market.

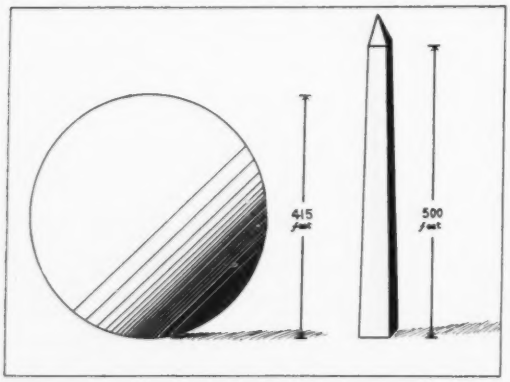
The 1934 Rubber Crop

Some Interesting Aspects

Leonard Smith



World's Production of Rubber in 1934 Would Make a Solid Column as High as the Empire State Building, 1,250 Feet, and 173 Feet Square



The 1934 Rubber Crop Would Make a Solid Ball 415 Feet in Diameter, ¾ the Height of the Washington Monument

THE year 1934 will scarcely go into history as a year of record volume in most industries; yet in the case of crude rubber production a new high of 965,000 tons was turned out, an advance of 12% over 1929, the previous record year, when 863,410 tons were produced.

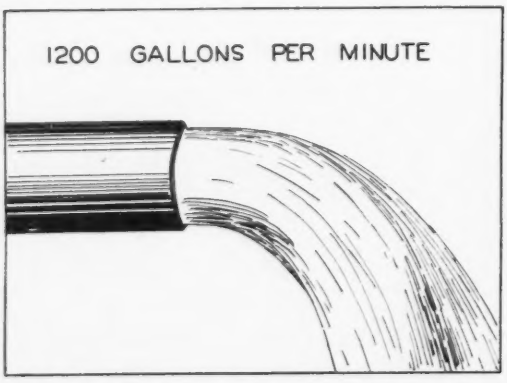
Some indication of the size of this enormous output may be gained from the accompanying illustrations which show that if the rubber were brought together in one piece it would form a solid column as high as the Empire State Building and 173 feet square throughout, or a solid rubber ball 415 feet in diameter, ¾ the height of the Washington Monument. The solid density of the Empire State Building is 37,000,000 cubic feet; that of the rubber crop would be 37,259,000 cubic feet.

The microscopic trickle of liquid latex which each rubber tree gives daily, if brought together, would be equal to a flow of 1,200 gallons per minute continuously, day and night, throughout the entire year and would fill a circular lake 6 feet deep and more than ¾-mile across. This cataract of liquid rubber would be equal to the flow of water over the Niagara Falls for a period of 5 minutes.

The growth of crude rubber production has recorded some astounding increases since it first became an article of commerce a century ago. For the first 35 years of this period the annual output was under 10,000 tons; in the next 20 years the production trebled and 10 years later, at the beginning of the present century, it reached 50,000 tons. By 1912 the development of the automobile industry was beginning to take effect, and the rubber production topped 100,000 tons for the first time. The war years brought the most feverish expansion, trebling the highest prewar year's output and setting the stage for the astonishing expansion of the 1920's. In this period the production of crude rubber increased an average of nearly 20% each year for 10 years, reaching 863,410 tons in 1929. The 3 ensuing years were ones of declining volume, but 1933 marked a resumption of the upturn and a new high record was established in 1934.

In considering the banner figure for 1934 it should be remem-

(*Continued on page* 43)



Latex Production of 1,200 Gallons per Minute Continuously Day and Night throughout 1934 Equals a 5-Minute Flow of Water over Niagara Falls

Para-Graphs

BELTING SEAM CONSTRUCTION. The tendency of the cover seam of belting to open during severe service is overcome by an improved method of construction. This consists in countersinking the seam below the belt surface in such manner as to relieve strain and shield the seam from wear or windage. A thick rubber cushion reenforced with bias fabric is vulcanized in position over the seam and aids in its protection.

CHEWING GUM BASE. Rubber latex is employed as an important ingredient in chewing gum base in the following preparation. In a steam jacketed mixing kettle the following ingredients are mixed at room temperature. To 100 parts rubber latex of 35% rubber content add 50 parts water and start the agitators. Then add slowly 7 parts cocoa powder, 85 parts pulverized coumarone resin, and 105 parts powdered hydrogenated vegetable oil. The mix is gradually heated to 110° C. to expel moisture and at the same time is constantly agitated for about 2 hours before removal from the kettle.

Another patent prescribes a more complex chewing gum base consisting of crepe sheet, sprayed latex, or similar substantially pure rubber combined with unsaponifiable resins, solvents of rubber, waxes, protein from cereal grains, and, in some cases, fibers of wood, asbestos, cotton, or silk, also small quantities of natural gums.

SPREAD COATING. A substitute for the ordinary plain doctor blade has been devised to enable the application of more liquid material in one operation than has heretofore been possible by the ordinary spreader. The special device is constructed to provide a discontinuous edge made up of a number of bearing surfaces for contact with the material to be treated, alternating with grooves of regulated width and depth, thus permitting a regular flow of liquid coating composition. Contact of the bearing surfaces with the sheet holds the latter a predetermined distance away from the inner surfaces of the grooves, allowing the coating composition to flow through the grooves, the size of which governs the thickness of the application.

CREPE WASH CLOTH. A particularly efficacious cleansing unit consists of a suitably shaped thin porous sheet of cohesive partially depolymerized unvulcanized pale crepe which can be tensionally wrapped about a cake of any kind of soap. When in contact with water, it can be rubbed against the skin where a copious lather will be formed while the rough but yielding crepe covering will vigorously cleanse without discomfort or injury.

LATEX BACKED FUR. A method of reenforcing fur by means of latex has recently been patented. In this process the skin or leather and a fabric reenforcement are secured together by a layer or film of latex. In practice the pelt and the reenforcing cloth are made wet (not merely dampened). The pelt is then stretched and nailed; then the cloth is stretched over the pelt and fastened to the nails. The latex is then applied to the cloth, soaks through, and causes the latter to adhere to the pelt. The skin and the reenforcing cloth, having been united by the film of latex, are permitted to dry a few hours or overnight before the fur is used in the manufacture of a garment.

CARBON BLACK IN RUSSIA. Carbon black is produced in a Soviet plant located near the Ivanhoe artificial leather factory. The present capacity, 2,500 tons a year, will be increased to 7,500 tons a year by the addition of 2 more units now being constructed. An experimental plant has been started in the Ishimbaev oil field to manufacture carbon black from natural gas. The product obtained conforms with the standards of the Rubber Trust and can be used in place of the imported product. Russia imported 1,017 metric tons of carbon black in 1933; no imports were recorded for the first 4 months of 1934.

ARTIFICIAL SILK. The addition of 3 to 5% (on the cellulose) of Revertex or Revultex to a viscose solution immediately before spinning, gives an artificial silk with less gloss and a higher resistance to strain (wet or dry state) and a greater extensibility. The influence of the latex is more marked with viscose "ripened" for 24 hours than with viscose that has either not been allowed to ripen or has been subjected to this process for 60 hours. The mat appearance depends on the degree of ripeness and the amount of latex present; an opalescent effect is obtained with 5 to 10% of latex.

RUBBER COVERED NAIL SET. Rubber continues to find advantageous application in the improved utility of tools. A nail set or punch with its steel shank suitably enclosed in and guided by a thick, strong, frustro-cone nosed cylinder of compressible rubber permits positive centering of the punch over the nail head and assures perfect setting of the nail without the danger of marring the surrounding wood surface.

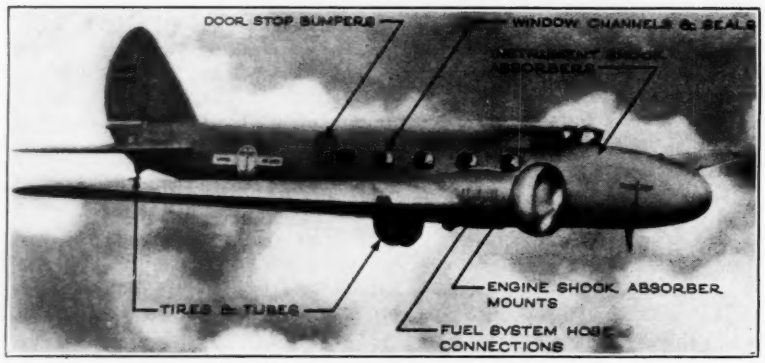
LATEX TEXTILE FINISH. Rubber latex finds application to the finishing of dress goods such as voiles, piqué voiles, organdies, and other gauze-like fabrics of rayon or vegetable yarns, to render them resistant to creasing and wrinkling without detracting from the desirable pliability. After natural waxes and coloring have been removed the fabric is treated with a sizing bath consisting of 15 gallons of water containing one pound of casein and 2 ounces of tri-sodium phosphate mixed with 5 gallons of latex solution containing 2% sulphur on the rubber content, 2% zinc oxide, and 2% piperidine pentamethylene dithiocarbamate. While it is then being heat dried and vulcanized, it is continuously flexed to prevent adhesion between its cross-woven threads. It is then washed by passing through a boiling solution consisting of one pound of 88% sodium oleate in 100 gallons of water, and finally dried in a tentering machine.

FAN BELT. The life of the V-type transmission belt is shortened because it always operates in a given position, thus causing the internal strains of service to be continuously repeated without variation of kind or location. This result is eliminated in a new molded rubber belt. Without circumferential tension an endless chain is filled with and completely embedded in a tough, solid, yet flexible, vulcanized rubber compound. In cross-section the belt is circular, but the surface is molded with slightly spiraling longitudinal corrugations or ribs. As this belt rotates around a set of grooved pulleys, it turns cross-sectionally, thus constantly changing the line of pulley contact and distributing stresses so that all portions of the belt share them.

Rubber on the Wing

Its Many Services on an Airplane[1]

MORE and more is the aviation industry presenting a profitable market to the rubber manufacturer. With every improvement on airplanes comes the call for rubber in some form or another; and wise is the manufacturer who heeds this call.



Some of the Rubber Parts of a Boeing Plane

A study of the new all-metal, low-wing, twin-engined Boeing transport reveals that rubber is used in it for a variety of purposes. One of the primary objectives in designing the plane was insuring the utmost in passenger comfort. Because smooth landings and takeoffs are important, tires received careful consideration, resulting in the selection of the largest, low-pressure type ever used by the company. Of particular interest are these huge main tires on the retractable landing gear, originally designed for the transport by the B. F. Goodrich Co., Akron, O. Each tire has an over-all diameter of 42 inches and a sectional width of 15 inches and is mounted on a wheel 16 inches in diameter. The inflation pressure is 30 pounds, to give proper balance between cushioning and carrying capacity for the 6,000-pound static load of each of the 2 main tires.

For normal landings and takeoffs the tire must have the proper degree of cushioning to give comfortable riding qualities on runways and soft taxiing qualities on other sections of the airport. In this instance the tires must provide proper support and cushioning for the 13,100-pound gross weight of the transport. Yet they must be strong enough also to withstand emergency impacts of up to 66,000 pounds. The tread, moreover, must be capable of resisting the unusually severe scuffing action of landings.

The tire has an air chamber volume of 14,335 cubic inches. Beads for one tire alone require 433 feet of piano wire, and the carcass contains 6½ miles of cord incorporated into the patented Goodrich weftless plies. Each piece of the material is examined in its raw state and again in its finished form by trained inspectors. The tire also is subjected to severe tests by Boeing engineers to insure dependable service.

These engineers likewise insist on a high safety factor in tires as well as in other parts of the plane. The new transport tires, although inflated to only 30 pounds per square inch, will stand 5½ times this pressure. While normally the tire deflects 33% with the static load of the airplane, it is capable of carrying 3¼ times this load before completely flattening against the ground. In addition it can withstand without injury the United States Department of Commerce requirement of 33,000 pounds' impact stress.

Although each tire has a rated maximum carrying capacity of 7,000 pounds, it weighs only 59½ pounds. A Goodrich bus balloon tire of the same rated capacity weighs 207 pounds. The economical aspect of this achievement in weight saving may best be illustrated by the fact that this new plane is capable of flying the 2,756 miles from San Francisco to New York in well under a day. If 10 pounds were added to each tire assembly, the planes would daily transport over 55,000 pound-miles of extra burden otherwise available for payload. Since United Air Lines flies more than 14,000,000 miles annually, the staggering amount of lost payload which would accumulate in a year is apparent.

The transport's tail wheel tire, with a width of 7 inches, carries 30 pounds of air. It is made by Goodyear.

The upholstered cabin chairs "float" on special rubber mountings. Rubber also helps take up vibration in the engine mountings; while the valuable flight and engine instruments in the pilots' compartment are saved from the effects of vibration by rubber shock absorbers. But those are just some of the uses for rubber. Other uses follow: cups in landing gear and tail wheel oleos; inner tubes; door stop bumpers; matting on rudder pedals; baggage net cord; battery box cushion; flexible vacuum line connections for instruments; chair pocket elastics; grommets; window channels and seals; door seals; cockpit weather stripping; landing light glass channel and seal; fuel system hose connections; stewardess's seat cushion; gasket materials and electric wire covering; and retractable landing gear stop.

Carrying 10 passengers, a crew of 3, baggage, and cargo, the new transport has a top speed of more than 3 miles a minute and a cruising speed of 171 miles an hour.

As the new planes have had significance for air travelers, they also have brought new possibilities for the speedy movement of merchandise. Air express is given the same fast transportation as that accorded passengers; and a growing volume of commodities is traveling the skyways as a result. This rise in passenger and cargo carrying necessitates more planes, and more ships call for more rubber parts, which demand should prove a real boon to the rubber manufacturing industry.

[1] Data and illustration through courtesy of Boeing Airplane Co., Seattle, Wash.

Annals of Rubber[1]

Chronological Record of the Important Events in the History of Rubber

1835. In 1835 were evidences in the various publications of that time that much interest had sprung up in the manufacture of caoutchouc into various articles, especially in the way of waterproofing for clothing. This was not confined to articles of rubber, but extended to leather, and other fabrics, in which the gum took no part. This was the case more particularly in England than in this country. Unfortunately the Patent Office at Washington had been destroyed by fire, and until 1845 the records were so imperfect as almost to be valueless. This probably accounts for a wide discrepancy in the dates of the leading inventions in india rubber as recorded by the various authors, and also for the fact that a great industry sprung up in this country, step by step, without a chronological record.

The invention of Thomas Hancock (1835), a prolific inventor in England with whom Charles Goodyear became entangled in an unfortunate interference on Hancock's part, has been mentioned; that of Wm. Sevier in 1836, another Englishman, who patented a process for the manufacture of india rubber. Sevier dissolved the india rubber and spread it over other gum mixed with litharge, acetate of lead, or sulphate of zinc, the 2 preparations being pressed together and then dried. His formula was one ounce of sulphate of zinc, acetate of lead, or litharge in one quart of turpentine. The compound was allowed to stand 3 or 4 days, during which time the mineral parts had settled, and then the turpentine was poured off. The formula of James Marten, patented in England in 1836, was to convert 400 gallons of water into steam passing into an alembic in which were 15 pounds of sulphuric acid. To this 300 gallons brown volatile oil, or spirits, were added. Then steam was added from the boiler to the bottom of the alembic, and another distillation of the more volatile or ethereal parts of the rough oil or spirit was made. Marten's broad claim is every mode and variation which can effect decomposition or carbonization of rough mineral, vegetable, or animal oil or spirit by sulphuric acid for the purpose of dissolving caoutchouc or india rubber.

1836. Charles Goodyear makes, in New York City, his first important discovery. He had already made up a compound by boiling caoutchouc and magnesia in quicklime and water, but it was found not to answer his purpose as it softened and even fermented. Goodyear now introduced a method of treating the surface of native india rubber by dipping it into a preparation of nitric acid, thus enabling the manufacturer to expose an india rubber surface to his goods, which, on account of adhesiveness, was theretofore impracticable. For this method, Goodyear took out a United States Patent, June 17, 1837, and, although the acid benefited only the actual surface of the rubber, goods continued so to be made until the introduction of vulcanization. The announcement of Goodyear's discovery attracted much attention, and samples of manufactured goods were taken by him to Washington, and shown more particularly to President Jackson, to Henry Clay, and to John C. Calhoun.

The President's acknowledgment reads as follows:

Washington, D. C., March 4, 1837.

MR. CHARLES GOODYEAR:

Dear Sir: I have received, through General Upton, of the Senate, your note conveying a print on gum elastic, and specimens of the pure gum designed for bandages for wounds and other useful purposes. I thank you for these samples of your skill in the new art in which you are engaged, and which I have no doubt will be found useful in a great variety of ways. I can only wish you success in the prosecution of your useful labors, and assure you that the sentiments of kindness which you express are cordially received and reciprocated by your humble servant.

ANDREW JACKSON.

In 1836 Goodyear invented his "acid gas" process. In partnership with William Ballard he began the manufacture of beautiful articles in New York City and Staten Island. These operations were terminated by the financial panic of 1836-37. Refinanced by E. M. Chaffee and John Haskins, Goodyear continued the use of his "acid gas" process of curing in the manufacture of rubber surfaced piano covers, table and carriage cloths.

Nathaniel M. Hayward invented the wringer roll in this year.

1837. Goodyear obtained patent No. 240, June 17, 1837, for his "acid gas" process.

In 1837, Robert William Sevier obtained a patent in England for the forming of a nap, or pile, upon the surface of waterproof cloth or fabric, and hats or caps.

At this time nearly all English patents mentioned the milk of the caoutchouc tree, as gathered in Brazil. This would seem to imply that inventors had the impression that means had been found to transport the product to England in this state. The editor of the journal of the *London Society of Arts and Sciences*, in commenting upon this stereotyped expression, avers that not a pint of the milk had been brought to England.

1838. Charles Goodyear further improved the manufacture of india rubber by the use of sulphur in a practical manner. He had become acquainted with Nathaniel Hayward, who had been employed as a foreman in the Eagle Co., Woburn, Mass., where he had made use of sulphur by impregnating the solvent with it. It was from Hayward that Goodyear received his first knowledge of the use of this material. They afterwards made life preservers by the use of sulphurous acid gas, and the solarizing process. In the subsequent year he purchased the sulphurous process of Hayward; but the odor of the goods and the fact that they would harden in cold weather were features that almost destroyed the value of the patent.

1839. Goodyear, continuing his search for a means to convert rubber into a practically usable condition by eliminating its stickiness, finally discovered the "curing" effect obtainable, by the accidental heating of a mixture of rubber, sulphur, and white lead to the point of vulcanization.

[1] Continued from INDIA RUBBER WORLD, Jan. 1, 1935, p. 41.

Goodyear was trying to incorporate some sort of drier in rubber that would permanently prevent rubber clothing from becoming sticky. It was easy to make goods that were free from tackiness for a week or 2, but they soon softened and became valueless.

One of his hundreds of experiments was a combination of rubber, sulphur, and white lead, dissolved in spirits of turpentine. This was spread with a broad bladed knife on several pieces of cloth. To hasten the evaporation of the solvent he hung the pieces near a stove. One, through accident, rested against the hot iron and turned black; while the others were of a grayish white color. Disgusted at his carelessness Goodyear took the black sample and was about to throw it away when its curious texture halted him. He examined it carefully and recognized what he termed the "change" and which Brockedon later happily termed vulcanization.

This is the story related by men who knew Goodyear, who were rubber men and knew the beginnings of the business. Emory Rider, John Murphy, A. Schlessinger, Henry G. Tyer, Daniel Hayward, J. B. Forsyth, all pioneers and all in a position to know, in talking with Henry C. Pearson, founder of this journal, agreed as to the facts here stated.

1840. J. Hancock took out in England a patent for forming a fabric by combining caoutchouc, or its compounds, with wood, whalebone, or other fibrous material, vegetable or animal, manufactured, or prepared, or with metallic substances.

The records of the English patent office in this and subsequent years show that the Hancocks were very busy in experimenting with various compounds, embracing many of the oils and chemicals in use in india rubber manufactories of the present day.

Daniel Hodgman builds a factory for the manufacture of rubber goods at the foot of 26th St., East River, New York City. Mr. Hodgman had been in business a number of years at this time and was a prominent dealer and manufacturer.

1840. William Freeman obtained an English patent for a road paving block, specifying a compound of rubber, sawdust, and sand or finely broken stone mixed in an iron cylinder, cooled, and pressed in block form. They were fastened together by rubber cement.

1841. J. A. Fanshaw used for the first time a mixing of rubber, sulphur, and lead oxide.

1842. Hancock was shown samples of Goodyear's vulcanized rubber by Brockedon, who applied the term "vulcanization" to describe its cured condition.

1843. Gutta percha was first made known in European countries by Dr. Montgomerie of the Indian Medical Service. He first noticed this substance as being used by the Malays for different purposes, notably handles for knives.

Dr. D'Almeida also brought to London, from the East Indies, samples of this material.

While travelers in the East Indies had noticed the use of this material to a large extent by the natives, these were the first dates of their introduction into Europe, and the event was considered of such importance that the London Society of Arts presented Dr. Montgomerie with a medal as a reward for his services.

Thomas Hancock took out a patent for an improvement in the manufacture of caoutchouc in combination with other substances, which preparation, or manufacture, is suitable for rendering leather, cloth, or other fabrics waterproof.

1843. Margaret H. Marshall obtained an English patent for a pavement material consisting of a mixture of vegetable gluten, albumin, oil rubber, and sulphate of lime It was called "Intonaco" and recommended, among other uses, for making tessellated roofs.

In the Autumn of 1843 Henry, brother of Charles Goodyear, started a factory at Naugatuck, Conn. In the Summer of 1844 he introduced the steam process, working the gum without the use of solvents. It was not until the gum came to be ground and worked with steam heat, instead of being dissolved in turpentine, that doubts as to the success of the manufacture were removed.

1844. Two hundred pounds of gutta percha were shipped from Singapore to England as an experiment. It proved a great success, and subsequent shipments followed, and it constantly grew in value as an article of commercial importance.

Charles Goodyear patented his process of vulcanization in America, France, and England. He was unfortunate with his French patent, the laws of that nation compelling him constantly to manufacture and keep in use the articles produced under it. He made superhuman efforts to do so, but his means being limited, he could not comply literally with the law, and the officials took advantage of his circumstances to annul the patent. He was also unfortunate with his English patents. His intercourse with Charles Macintosh had been of very intimate character, and many experiments had been carried on in his English factories. In the course of these experiments Thomas Hancock, an English inventor, who was employed in Macintosh's mills, became fully acquainted with Goodyear's methods and formulæ. The consequence was that, much to the surprise of all parties who had any knowledge of the facts, Thomas Hancock secured a patent antedating that of Charles Goodyear, almost identical in method with it, and also with the French patent which had been published a few weeks previously. Hancock afterwards made such admissions, in evidence under oath, as proved that he was indebted to Goodyear for the basis or practically the whole of the patent granted him.

Charles Goodyear took out this year in the United States 3 different patents. At that time he was a resident of New York, but subsequently moved to New Haven, Conn., at which place he continued his experiments, and in the succeeding year forwarded 2 more patent applications to Washington. One of Goodyear's solutions at this time was: 5 parts sulphur; 7 parts white lead; 25 parts caoutchouc.

E. E. Cassel received an English patent for a paving compound consisting of chalk, mineral tar, melted rosin, liquid caoutchouc, and sulphur.

(*To be continued*)

RADIO-ACTIVE LATEX THREADS. An interesting application of latex, that is hardly practicable with dry rubber, resides in incorporating water solutions of radio-active materials with latex prior to coagulation, then converting the resulting homogeneously impregnated radio-active rubber into thread for weaving elastic medicinal supports and bandages.

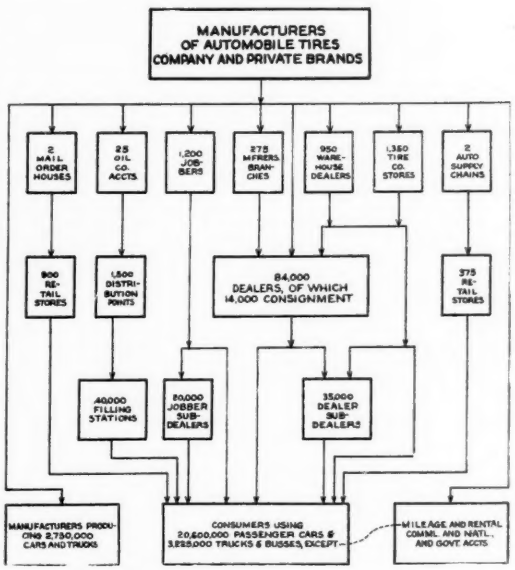
RUBBER INSERTS FOR GRINDING WHEELS. Round rubber disks intended for the protection of grinding wheels are made of a tough black rubber compound and are 1 mm. thick, the internal and external diameters ranging from 15 mm. and 80 mm., respectively, to 100 mm. and 500 mm., respectively. The rubber has a design on its surface and is inserted on both sides between the grinding wheel and the side cheeks. It is compounded to give great resistance to shearing while it is sufficiently soft and elastic to press into the unevennesses of the grinding wheel as well as into the turning groove.

Tire Outlets

Tire Distribution and Retail Outlets in the United States, 1934[1]

E. G. Holt[2]

INFORMATION concerning the number of establishments through which tires are distributed and sold has been received by the Bureau of Foreign and Domestic Commerce in connection with semi-annual surveys of stocks of tires in hands of distributers, and by the National Recovery Administration in connection with Article XI, Section 7, of the Tire Code. The writer has been in charge of the tire stock surveys for some years and under temporary appointment as Assistant Deputy Administrator in NRA was responsible for analysis of their data referred to above. The gross figures secured through the NRA questionnaires have now been released to the Bureau of Foreign and Domestic Commerce for analysis with regard to the number of tire outlets. As a result, it is possible to present more accurate data on the subject than have hitherto been available in this Bureau. These data are summarized in the chart herewith portraying the situation as of early 1934.



Tire Outlets in the United States—1934

The data now available to the Bureau of Foreign and Domestic Commerce are closely accurate in respect to the number of stores operated by the 2 leading mail order distributers of tires, and by 2 chain systems described hereafter as "auto supply chains;" they are likewise quite specific as to the number of branch distributing points maintained by tire manufacturers, the number of stores owned and operated by tire manufacturers, and the number of accounts classed as "warehouse dealers" by the manufacturers—and the numbers are shown in the chart.

Oil Company Accounts

Under the title "oil company accounts" in the chart it is intended to include only those distributers which *purchase* tires for distribution through filling station chains operated by the oil companies; this group is therefore exclusive of oil companies which by contract with tire manufacturers permit their stations to handle tire company products which the latter supply and bill directly to the stations as dealers. The number of such oil company accounts, their number of bulk distribution points, and the number of their filling stations which handle tires are conservatively estimated in the chart, having due regard to information reported to this Bureau as to the number of outlets of some distributers in this class. The figures shown in the chart in all cases are intended to represent the situation with duplications eliminated.

Jobbers

Under the Tire Code a "jobber" is one who sells 75% or more of his total volume of tires and tubes through or to dealers for resale to consumers. In reply to a questionnaire on jobber distribution manufacturers of automobile casings reported 1,657 accounts classified as jobbers, and manufacturers reporting 962 of these accounts estimated the number of retail outlets serviced by the 962 accounts at above 46,500. None of these manufacturers had actual knowledge as to the number of retail outlets serviced by their jobbers. There are probably few strictly legitimate (under the Tire Code definition) jobbers, as the jobber function has been largely assumed by manufacturers' branches, warehouse dealers, and mass distributers previously mentioned. If all the jobbers were assumed to have the ratio of sub-dealers estimated for the 962 for which estimates were reported, the collective number of sub-dealers (unadjusted for possible duplications) for jobbers would be close to 80,000. This number would be so patently out of harmony with what is generally believed the relative importance of jobbers in present-day tire distribution that it has not been included in the chart. The number of jobbers estimated in the chart is 1,200; the number of jobbers' sub-dealers shown was estimated from other data as explained below. In this connection, however, several manufacturers produce special company brands of tires commonly spoken of as "jobber lines," and several of these do have a widespread distribution; and there is in addition an appreciable number of private brands distributed through jobbers. Therefore, while to be conservative, the figures discussed above have been disregarded, they are not without some substance.

Dealer and Sub-Dealer Accounts

In a separate questionnaire on dealer distribution each manufacturer of casings was asked to report the number of active dealer accounts for company brand tires, and the estimated number of retail outlets through which their tires (after passing through jobbers, warehouse dealers, etc.) were sold to consumers. The number of

[1] Special Circular No. 3,553, Rubber Section, compiled and issued by Leather-Rubber-Shoe Division, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

[2] Assistant chief, Leather-Rubber-Shoe Division.

active dealer accounts reported (adding figures reported by the different manufacturers) was 121,079, and the number of retail outlets estimated by manufacturers reporting 108,988 of these accounts was 186,218. Manufacturers reporting the remaining 12,091 direct dealer accounts did not estimate the total number of their retail outlets—some of these would have had no sub-dealers; while for others handling so-called jobber lines it was reported that while there were sub-dealers, their number could not be estimated. Adding the 12,091 dealers to the 186,218 estimated outlets gives a figure of 198,309 total outlets estimated—note that in order to be conservative no addition was made here for sub-dealers of the 12,091 dealers. This gives 121,079 active dealer accounts, and an estimated number of 198,309 retail outlets, reported collectively by the manufacturers of casings.

Number of Dealers and Sub-Dealers

In the survey of distributers' stocks of tires made by this Bureau in April, 1934, the percentage of dealers stocking one make, 2, 3, and 4 or more makes, was determined for 20,000 dealers, and the percentages were published in the report[3] (Circular 3,526) as shown below. Use of this information makes possible reducing the above figures for reported active dealer accounts and estimated retail outlets to an approximate equivalent number of individual dealer accounts and retail outlets. It is only necessary to assume that the percentages, derived from analysis of 20,000 reports in the April survey, are properly applicable to the statistics discussed above. The necessary calculation follows:

Number of Makes Handled	Percentage of Dealers		Makes Handled by 100 Dealers
1	69.7	multiplied by 1	69.7
2	24.3	multiplied by 2	48.6
3	4.4	multiplied by 3	13.2
4 or more	1.6	multiplied by 5	8.0
	100.0		139.5

This calculation indicates that there will be 100 separate dealers for each 139.5 accounts reported collectively by the manufacturers. Using 140 accounts (to be conservative) for each 100 separate dealers, the figures of 121,079 and 198,309 will be reduced, respectively to about 86,500 and 141,500. The figure of 86,500 is believed to include tire company stores and warehouse dealers, and allowing for these the figure shown in the chart is 84,000 dealers billed directly and serviced directly or through branches, warehouse dealers, and/or company stores. Some manufacturers place tires with dealers on consignment, and others accomplish much the same end through extension of a limited continuing non-interest bearing credit to small dealers; the collective number of such accounts reported was approximately 14,000.

The difference between the 141,500 retail outlets and the 86,500 accounts billed direct, as estimated above, would be 55,000, and this difference is shown in the chart divided between "jobber sub-dealers" and "dealer sub-dealers." The accuracy of the division of the 55,000 is open to question, but the figure itself is based on estimates made by the manufacturers of casings as reduced by methods derived from official data.

This circular does not purport to give information as to the number of independent tire dealers, or to define "independent tire dealer" either as to degree of *independence*, or as to the extent to which a dealer should *deal in or stock* tires, to entitle him to that description. It merely purports to show, as accurately as possible, the number of accounts handling tires as indicated by data reported by manufacturers and distributers. Reports submitted by manufacturers producing only inner tubes were not included in these calculations. The effort has been to make estimates conservatively low, rather than otherwise.

[3] See India Rubber World, Sept. 1, 1934, p. 32.

"Mass Distributers" and "Independent Dealers" in Tire Stock Surveys

In surveys of distributers' stocks of tires made by this Bureau the outlets described in the chart as mail order houses and their stores, oil company accounts and their filling stations, auto supply chains and their stores, and tire company stores have been included under the general description of "mass distributers." Other establishments submitting reports have been described as "independent dealers," but the term has become inaccurate, and it has been continued in use as a convenient description in connection with surveys concerned primarily with the amount of tires in stock rather than with the nomenclature of distribution channels. The reports included under this "independent dealer" heading were received from establishments corresponding to the 84,000 dealers, the 950 warehouse dealers, and the 1,200 jobbers shown in the chart, the mailing list having been made up from the manufacturers' lists of active accounts.

Lack of Accurate Comparative Data

There are no equally accurate data available concerning the number of tire outlets in past years. The mailing list now used in the tire stock surveys was first made up in 1926-27. It included the names of about 30,000 establishments which reported stocks in the survey of April, 1926, plus the active mailing lists of the 5 leading manufacturers. The task of making one master list from the 6 different lists was only partially completed for the October, 1926, survey; accordingly there was considerable duplication of names in the list, which numbered 182,000 at the time of the survey. When the April, 1927, survey was made, the lists had been properly combined, duplications eliminated, and about 8,000 names removed as a result of corrections for firms which reported "inactive" in the October, 1926, survey. The mailing list numbered 130,000 in April, 1927.

As indicated above, the tire stock surveys of this Bureau have included no returns from the establishments described as "dealer sub-dealers" and "jobber sub-dealers" in the chart. In suggesting a method of estimating total "dealer" stocks in connection with recent surveys, a figure of 70,000 dealers has been used as a multiplier against the "average stocks per dealer" regarded as the indicative factor arrived at as a result of the surveys, care being taken to indicate that the multiplier was not necessarily accurate. The surveys show that a very large proportion of the dealers reporting stocks carry small stocks. An indefinite but consequential number report "no stocks on hand" on reporting dates. The writer believes that if reports could be secured from all establishments on the mailing list used, the average stock per dealer would be noticeably lower than for the 20 to 25% or so of the establishments which submit reports, and it is certain that the average stock for sub-dealers mentioned in the chart would be only fractionally as important, per establishment, as for the direct dealer accounts. It would patently be improper to use the aggregate number of outlets shown in the attached chart as the multiplier for "average stocks per dealer" arrived at through the tire stock surveys. As of possible interest in this connection, it has been estimated that "independent dealer" renewal sales in 1933 amounted to about 21,600,000 casings; while the stocks held by dealers, suggested in our surveys (April and October, 1933, averaged) amounted to 4,413,000 casings, on which basis the net

average turnover would work out at about 4.9 times for that year, making no allowance for wholesale trading between dealers.

Comparison with Census Data

Data published by the Bureau of the Census in connection with the census of retail distribution for 1933 are not particularly indicative as regards the number of establishments handling tires. Establishments are classified on the basis of their major sales, and tires apparently very seldom represent the major line handled by a dealer. The tire stock survey report of April, 1934, indicates that 72.3% of the dealers reporting stocks of tires also handled gasoline, 66.9% of them handled batteries, and 30.4% automobiles. The recently issued summary for the 1933 census shows 305,403 stores in the automotive group, of which 170,404 are classified as filling stations, 86,454 as garages and repair shops, 30,646 as motor vehicle dealers, 16,027 as accessories, tire, and battery dealers, and 1,872 as other automotive stores. The total number of retail tire outlets as estimated in the accompanying chart is approximately 183,775, or 60% of all stores classified in the automotive group (which does not include hardware, country general, or city department stores, each of which would often handle tires).

United States Exports of Heels

Total exports of rubber heels during November, 1934, were 44,187 dozen pairs, value $24,800. Norway, our best customer, took 7,969 dozen pairs, value $3,796; Sweden came next with 6,047 dozen pairs, value, $2,443; then Cuba with 4,218 dozen pairs, value $2,268; and the Philippine Islands were fourth in the list with 4,535 dozen pairs, value $2,180.

The 1934 Rubber Crop

(*Continued from page* 36)

bered that governmental restriction became effective on June 1 in all producing countries in the Far East. One can not help speculating on how high production might have gone if restriction had not been introduced.

British Malaya continues to produce the largest share of the world's rubber, with 50% of the 1934 crop. Malaya has practically regained the preeminent position she occupied in 1922; while Netherland India has dropped from a high percentage of 45% in 1927 to 38% of the 1934 total. Under the restriction scheme the percentages of total for these 2 countries will remain substantially unchanged for the next 4 years.

New York Automobile Show

Sponsored by the Automobile Merchants Association

THE 1935 Automobile Show was held under the auspices of the Automobile Merchants Association of New York, Inc., with the cooperation of Motor & Equipment Manufacturers Association at Grand Central Palace, New York, N. Y., January 5 to 12, 1935. This affair marks the first time that the Automobile Merchants Association sponsored the National Show. In the past it has been under the auspices of the National Automobile Chamber of Commerce or that organization's predecessors. The last few years, since the untimely death of the veteran manager, S. A. Miles, the direction of the show has been in the hands of Alfred Reeves, vice president of the Chamber, now renamed the Automobile Manufacturers Association.

The Automobile Industry—1934

Cars and trucks produced in U. S. and Canada	2,885,000
Passenger cars	2,296,000
Motor trucks	589,000
Production, percentage increase over 1933	45%
Motor vehicles registered in U. S.	24,840,000
Motor cars	21,430,000
Motor trucks	3,410,000
World registration of motor vehicles	34,600,000
Gasoline used by motor vehicles (bbls. of 42 gal.)	345,000,000
Lubricants used by motor vehicles (bbls. of 42 gal.)	10,500,000
Crude rubber used by motor industry, 1934 (lbs.)	707,800,000
Cotton fabric used in tires, 1934 (lbs.)	196,000,000

This thirty-fifth annual show will go down in automotive history as the year in which the industry accomplished a really remarkable feat in injecting so much of value into the new models and crowning them with so many important developments in performance, safety, riding comfort, and convenience and operating economy.

Above all others, this is the year of recognition of safety, comfort, and convenience in motor cars. The combination of power and speed has been eclipsed by riding luxury and safety, and the outstanding development, readily apparent to the average visitor, is the greater comfort capacity with both front and rear seats offering unparalleled ease. Bodies are much longer, wider, and roomier, with most models supplying ample room for 3 on the front seat. No longer will passengers be inconvenienced by luggage, for ingenious locked compartments are provided; so is space for the spare wheel. Streamlining is still further developed in 1935 models.

Knee action seems to be less stressed as a structural feature than during last year. Balanced springing of the vehicles is substituted for knee action to secure level riding over rough roads. This is accomplished by locating the engine further forward over the front axle, thus equalizing the load between front and rear axles. This construction also allows moving the seats forward sufficiently to permit the rear seat passengers to ride in front of the rear axle rather than immediately over it. Thus redistribution of weight and softer springs accomplish much that was sought by knee action and at less expense.

While rubber is vitally essential in automobile construction and performance the fact is not evident at the show in the form of many special exhibits. None of the large tire companies exhibited. Tires were displayed, however, in the accessories section of the show by the following New York rubber companies, Armstrong Tire Service Corp., Martin Custom Made Tires Corp., and Para Tire & Rubber Corp.

EDITORIALS

Unemployment Insurance

BRITAIN'S experience with unemployment insurance is set forth in a recent pamphlet, "Unemployment Insurance: Lessons from British Experience," and the findings are briefly summarized by the National Industrial Conference Board as follows:

1. Unemployment insurance is not a remedy for depressional unemployment.

2. Seasonal and casual unemployment tends to become permanent as a result of statutory unemployment relief.

3. Chronic unemployment, due to permanent loss of trade, must be dealt with by other measures than unemployment insurance.

4. Without an efficient and honest administrative force unemployment insurance has no chance of success.

5. Any scheme of unemployment insurance must be accompanied by a plan of unemployment relief for the workers who lose their right to insurance benefits or who cannot qualify for the receipt of benefit and for workers in uninsured occupations.

6. If unemployment insurance is not supplemented by a scheme of relief, the temptation to extend statutory benefits to persons not qualified under the law is irresistible, making it impossible to avoid political raids on the unemployment fund until the state of national finances becomes so critical as to threaten the solvency of the nation.

7. If unemployment insurance is uniformly applied to all types of unemployment, it impairs the elasticity of the economic system.

8. If unemployment insurance is not based on an accurate knowledge of the facts of unemployment, it will be abused both by workers and by employers.

In the United States reliable information concerning the extent and nature of unemployment is almost totally lacking, and a fact-finding body composed of representatives of labor, industry, state and local governments, and the general public should be established. The task of this body would be to make a thorough survey of the facts of unemployment, and to make recommendations for action by industry and by the legislatures.

Now Is the Time to Advertise

THE first annual indexes compiled by *Printers' Ink* indicate a definitely rising trend in advertising during 1934 as compared to the year before. According to the report, there was an approximate average gain of 16% last year compared with 1933. Gains of 33% were recorded for farm papers and radio, 29% for magazines, 12% for newspapers.

Labor's Opportunity

ONE aspect of the Government's recovery program which has been given scant recognition is that of distortion of price and wage relationships by arbitrarily raising wages and reducing working hours regardless of a corresponding increase in production. Analysis[1] of official statistics shows that labor has not profited by the administration's program; rather it has suffered a very large decline in real income.

For the first time in 30 years the real income of employed wage-earners failed to make a substantial gain in a depression year. In the depression year of 1921 the real income per average worker increased 44%; in the depression year of 1931 the real income per employed worker rose 18.5% over the boom year of 1929. For those wage earners and industrialists who held hope that shorter hours and higher wage rates without a corresponding increase in productivity would increase purchasing power, official figures tell a sorry story. These statistics are devoid of both sentiment and theory; they tell only what actually happened. It matters little that the average hourly wage of thousands of workers was increased; it matters little that total payrolls increased. None of these are important in the face of a sharp reduction in the annual income per worker employed and a sharp rise in the price of merchandise he must buy. Artificial increases in wage rates without corresponding increases in productivity rebound with terrific force upon the people who are supposed to be benefited—the workers themselves—as well as upon industry and public alike.

Active business depends upon balanced prices. If modifications in wage rates and working hours sufficient to lower production costs to the level of incomes are made, business volume would speedily increase enough to absorb unemployment as well as yield higher annual dollar incomes for all. If labor will cooperate with industry and government to effect these modifications in costs and prices, all else follows—fair prices to consumers, high annual incomes to workers, and jobs by the millions. Now is the time and the opportunity for labor to promote recovery by assisting in such essential moves.

[1] "Labor's Opportunity to Promote Recovery," by Allen W. Rucker and N. W. Pickering, president, Farrel-Birmingham Co., Inc.

What the Rubber Chemists Are Doing

Colloidal Changes during Rubber Vulcanization[1]

Ira Williams[2]

THE author's conclusions are given in the extracts quoted below from this important research on vulcanization.

Vulcanization may result primarily from colloidal phenomena, but there is no doubt that combination of sulphur is essential in hot vulcanization and the presence of an accelerator is beneficial. While combined sulphur is necessary, no relationship has been found between the extent of combination of sulphur and the physical properties of the rubber when vulcanized under different conditions. The great variation in physical properties obtainable with the same amount of combined sulphur indicates that the chemical combination of sulphur is not the primary cause of vulcanization.

It is the purpose of the present paper to show that rubber which has combined with sulphur will disaggregate under the influence of accelerators and to present data which indicate that this disaggregated product can gel either because of its concentration or under the influence of gelling agents to produce vulcanization.

Peptization of Lightly Vulcanized Rubber

Vulcanization may be carried out in solution to produce a gel which can be readily peptized. Cements containing sulphur, zinc oxide, and piperidinium pentamethylene dithiocarbamate will gel in a comparatively short time at room temperature. If the resulting gel is treated with more of the accelerator, the gel will be reduced to a mobile liquid. In certain instances the resulting liquid will again gel and may again be peptized by the addition of more accelerator. This process, however, cannot be repeated indefinitely since a gel will finally result which can no longer be peptized. The inability to peptize a vulcanizate which is in a more advanced state of gelation indicates that the peptizing action of the added accelerator was not due only to a reversal of the previous gelling process.

The gelling and peptizing action are illustrated in the following experiments:

The base stock consisted of smoked sheet rubber containing 2% of sulphur and 2% of zinc oxide. Seventy grams of this stock were made into a cement with 930 grams of benzene. Part of this cement was treated with 1% of piperidinium pentamethylene dithiocarbamate accelerator based on the weight of the rubber, and 10-cc. portions were placed in test tubes. The time of gelation at room temperature varied among the different tubes from 9 to 11 days. As soon as the cement in one of the tubes had gelled, it was treated with 0.2-gram of the accelerator on the surface of the gel. After standing for 5 hours, the gel had been reduced to a cement more mobile than the original. Similar experiments were conducted with the other tubes at increasing periods of time after gelation. After the cement had been gelled for about 5 days, it was necessary to increase the accelerator to 0.3-gram and insert it into the gel with a glass rod to produce peptization. After 15 days the gel softened, but did not produce a smooth cement. After 2 months the gel could not be peptized.

Steps Involved in Vulcanization

Experiments lead to the conclusion that vulcanization is the result of several actions which take place to a varying extent under different conditions. The properties of the resulting vulcanizate will vary accordingly.

Fig. 1.

Some of the essential reactions which appear to be involved in vulcanization are illustrated diagrammatically in Figure 1 in which R, R', and R" are different units of rubber and s is sulphur or other substance which is capable of combining with rubber. The first step consists in chemical action of the sulphur and rubber to form the unit Rs. The speed of this action can be influenced by materials such as accelerators which modify the size and activity of R and by the activity of s. The second step consists in the breaking up of chemical product Rs into X smaller units, R', which are more active chemically and colloidally, and a smaller chemical unit, R"s. The value of X and the size of R" are largely a function of the degree of peptizing action of the accelerator. The third step consists in the combination of units R' into a larger unit less active chemically and more stable in the presence of peptizing agents. This action is increased in the presence of soluble zinc. If sufficient rubber is changed to this type of gel, the solubility and plasticity of the entire mass is greatly decreased.

Various accompanying reactions can be written with most parts of Figure 1 as starting points. For example, some accelerators react directly on unit R to produce new units. Unit R" can be further reduced by more efficient accelerators or can combine with sulphur to approach ebonite in composition. The unit (X/n)Rn may also combine with sulphur, but at a reduced rate. The presence of zinc should not favor the combination of sulphur because of the decrease in concentration of R'. This agrees with the known fact that zinc oxide does not favor the production of ebonite. Beadle and Stevens[3] have shown that, while zinc oxide greatly increases the tensile strength of a rubber-sulphur compound, the rate of combination of sulphur is not increased. Kelly[4] has shown that, after correction for sulphur combined with zinc and other non-rubber constituents, the amount of sulphur combined with rubber containing only natural accelerators is decreased by the presence of zinc oxide. The course of vulcanization is undoubtedly altered in many cases by change in the chemical nature of the accelerator during the process and by activation of sulphur by certain accelerators. Sulphur may be replaced by other agents, in which case different peptizing agents may be necessary, or the rubber may disaggregate without peptizing agents. Other gelling agents than zinc are conceivable.

Vulcanization appears to consist of a chemical reaction accompanied by

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[1] Presented before the Division of Rubber Chemistry at the 88th Meeting of the American Chemical Society, Cleveland, O., Sept. 10 to 14, 1934. This paper is Contribution 30 of the Jackson Laboratory, E. I. du Pont de Nemours & Co., Inc. *Ind. Eng. Chem.*, Nov., 1934, pp. 1190-93.

[2] E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

[3] Beadle and Stevens, *J. Soc. Chem. Ind.*, 30, 1421 (1911).

[4] Kelly, W. J., *Ind. Eng. Chem.*, 14, 197 (1922).

changes of a colloidal nature. The physical properties of the resulting vulcanized rubber do not depend on the amount of chemical action, but on the degree to which the units Rs have been resolved into units XR' and in the degree of combination of these units.

Koroseal

A NEW synthetic rubber-like material[1] possesses characteristics that render it far superior to rubber for certain specialized applications. At present the prohibitive cost of its manufacture precludes its adoption as a general substitute for rubber. Although not the same as rubber in chemical composition, it may, like rubber, be varied by compounding methods from very hard to soft doughy consistency and can be molded into any shape. It is odorless and can be produced, also, in a variety of colors.

The resistance of Koroseal to swelling, when exposed to many oils and greases and to disintegration in the presence of corrosive chemicals, is unusual. It even resists the action of chromic acid and hot concentrated nitric acid. The new material is ideal for piston packing because of the tight seal afforded by the Koroseal compound in the presence of oil.

[1] Discovered and developed in the laboratories of The B. F. Goodrich Co., Akron, O.

Studies in the Vulcanization of Rubber

VI. Thermochemistry [1]

John Blake [2]

Summary

INVESTIGATORS generally agree that there is a substantial evolution of heat during the vulcanization of rubber to form ebonite. There are, however, differences of opinion regarding the thermal changes in the soft rubber range (0 to 8% sulphur), and past data are inconclusive.

Qualitative data have been obtained indicating that a small but definite heat evolution occurs during vulcanization with 1% sulphur, and larger amounts are evolved at higher percentages. The effect of an accelerator and the action of dinitrobenzene and selenium have also been investigated.

The results tend to confirm the previously proposed theory that vulcanization consists of 2 successive reactions. The first, or soft rubber reaction, is affected strongly by accelerators and involves little or no heat interchange; the second, or ebonite reaction, is comparatively insensitive to accelerators and strongly exothermic.

[1] *Ind. Eng. Chem.*, Dec., 1934, pp. 1283-86.
NOTE: Previous articles in this series have appeared in *Ind. Eng. Chem.*, July, 1930, pp. 737-55, and May, 1932, pp. 549-55.
[2] Simplex Wire & Cable Co., Boston, Mass.

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Boston Group

The mid-winter meeting of the Boston Group, Rubber Division, American Chemical Society, held January 7 at the University Club, Boston, Mass., was attended by 131 members and guests. The speaker was Dr. Ernst A. Hauser, chief chemist of the "Semperit" Austro-American Rubber Works, Vienna, Austria, who talked on "Casting Rubber Goods." He showed samples of toys, shoes, and various other items made with latex by various methods of casting and explained the advantages of casting such products compared with the usual molding process. Dr. Hauser stated that it behooves rubber manufacturers to investigate the merits of latex casting to forestall the invasion of the field by outsiders since the cost of equipment required is very small and the machinery itself simple.

New Machines and Appliances

INTERESTING AND TIMELY PATENTS

Fig. 1. Molded Rubber Shoe

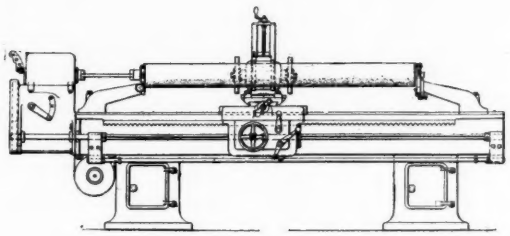


Fig. 2. Printers' Roller Grinder

Footwear with Molded Outer Surface

RUBBER shoes of molded surface design are produced by a novel process[1] consisting in dipping an engraved metal shoe last into compounded rubber latex to deposit upon it a layer to form a rubber upper to be used in the production of the finished shoe. When the desired layer has been provided, it is dried and then stripped from the form, as illustrated in Figure 1, and turned inside out. Next it is mounted in its reversed condition upon a shoe building last of the usual shape upon which may have been built fabric inner shoe parts. Then either with or without the addition of a calendered or other rubber sole the assembly is subjected to vulcanizing heat under fluid pressure. The invention thus provides for a rubber facing or upper having a molded outer face which may be of intricate design or for the production of an integral impervious layer extending throughout the entire shoe including sole and heel portions.

Soft Rubber Printing Rollers

Soft rubber printers' rollers may be successfully ground and trued in the lathe grinding machine represented in side elevation in Figure 2.[2] A high-speed motor is used on this machine and preferably relatively large grinding wheels so as to obtain maximum surface speed of the wheel upon the work. The motor and its cutting wheels may be adjusted both vertically and horizontally so as to bring the wheels to the rear of the roller or directly above the center and at any angle desired with respect to the roll center. This action enables crowning the roller to any extent desired.

V-Belt Machine

The accurate alinement of fibrous cores within the rubber body of a V-belt is effected by the apparatus[3] in Figure 3, which also serves as a means for constructing a number of such belts simultaneously. As shown in the illustration, a pair of belt core supporting drums *A* and *B* are spaced parallel, and each is provided with alined grooves for holding a number of non-extensible belt cores *C* in spaced arrangement. Drum *A* is journaled in horizontal bearings in pedestal *D*. Drum *B* is rotatably mounted in a cross-head *E* slidable on a pair of rods *F*. A screw feed *G* operated by a hand wheel *H* serves to adjust the drums *A* and *B* with respect to each other.

In practice a number of endless cores *C* are arranged to encompass the drums *A* and *B* seated in the grooves provided to receive them. The drums are then adjusted to tension by the hand wheel *H*; the roller *I* is brought into engagement with the cores *C* on the drum *A*. A sheet of unvulcanized rubber material is fed between the cores *C* and the roller *I*; the drum *A* is rotated for this purpose at a slow speed. Successive layers of sheet material are thus applied. When the desired thickness has been attained, knife blades *J* are pressed against the material during the continued rotation of the drum to sever the band between the sets of cores into separate belts ready for molding. Prior to the molding operation the belts are turned to bring the cord cores to the outer periphery of the belts.

Rubber Printing Plate

Composite rubber printing plates[4] are constructed as shown in vertical section in Figure 4. The base of this plate is of soft metal which can be readily bent to the curvature of the plate cylinder of a rotary press, yet is firm enough to retain its shape when clamped on the bed plate of a printing press or when mounted upon a wooden block.

A 4-ply fabric insert is bonded together and to the printing rubber and metal base plate by thin layers of rubber bonding. The top and bottom fabric layers, different from the intermediate layers, are preferably of "Grade A Airplane Cloth."

A suitable rubber cementing compound for bonding the 4 layers of fabric can be made after the following formula:

Rubber	30 lbs.
Zinc oxide	25 lbs. 8 oz.
Antimony sulphide	5 lbs. 4 oz.
Sulphur	3 lbs.
Lime	6 oz.
Diphenylguanidine	5½ oz.
Stearic acid	½ oz.
Phenyl-beta-naphthylamine	6 oz.

Similarly, the formula for bonding the top surface of the fabric insert to which the surface is to be applied follows:

Rubber	50 lbs.
Ceresin wax	2 lbs. 8 oz.
Coumarone resin	10 lbs.
Petrolatum	1 lb. 8 oz.
Stearic acid	1 lb.
Orange shellac	12 lbs. 8 oz.
Tetramethylthiuram disulphide	2 lbs.
Mercaptobenzothiazole	4 oz.
Zinc oxide	1 lb.

The composition may be prepared for calendering in the usual manner according to the formula below:

Ethylene dichloride sodium polysulphide reaction plastic	50 lbs.
Rubber	5 lbs.
Zinc oxide	11 lbs.
Clay	15 lbs.
Whiting	20 lbs.
Diphenylguanidine	3 oz.
Mercaptobenzothiazole	1 oz.
Stearic acid	4 oz.
Paraffin	4 oz.
Methyl salicylate	1 lb. 8 oz.

Powder-like Rubber Compositions[5]

These patented products containing rubber from aqueous dispersions may be mixed with fibrous, granular, or powdered materials. Thereafter all or most of the water is removed, and the dried product is crumbled into a pow-

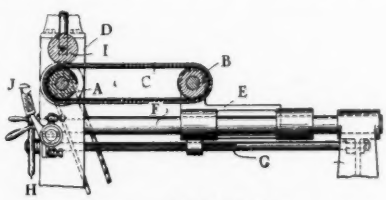


Fig. 3. V-Belt Machine

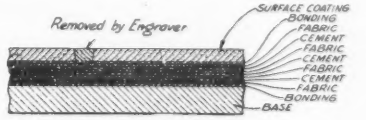


Fig. 4. Composite Printing Plate

[1] U. S. patent No. 1,969,962, Aug. 14, 1934.
[2] U. S. patent No. 1,968,550, July 31, 1934.
[3] U. S. patent No. 1,969,067, Aug. 7, 1934.
[4] U. S. patent No. 1,971,044, Aug. 21, 1934.
[5] U. S. patent No. 1,970,469, Aug. 14, 1934.

der. These powders are also capable of being pressed up cold to give hard molded products. As an example, a flocculent granular precipitate of the following composition

	Parts by Weight
Rubber	100
Sulphur	5
Zinc oxide	5
Accelerator	0.5
Aluminium silicate	15

is first prepared as follows.

To 340 parts by weight of a 60% rubber latex obtained by centrifugal action, the following ingredients are added with constant stirring and in the following order: (1) 20 parts by weight of a 50% sulphur dispersion; (2) 20 parts by weight of a zinc oxide 50% dispersion; (3) 2.8 parts by weight of a 35% accelerator dispersion; (4) 1,840 parts by weight of water plus 78 parts by weight of a 5% sodium silicate solution; (5) 650 parts by weight of water plus 72 parts by weight of aluminium sulphate crystals.

In this way a rubber precipitate is obtained wherein the concentration of the precipitate in the aqueous medium is 5%. The precipitate is allowed to drain on a filter, and a paste-like mass is obtained containing approximately 18% total solids. This paste-like mass is compounded with disintegrated leather dust in the proportion to give 70 parts of leather dust to 30 parts of dry precipitate. The admixture is then dried and finally disintegrated to a powder-like crumb that can be put into a mold and pressed up cold for 30 to 40 seconds under a pressure of 5,000 pounds per square inch to produce a hard leather-like molded article.

Grinding Machine

This machine shown in side elevation is designed automatically to receive, grind, and discharge wringer rolls.[6] Driving the work is simplified by frictionally engaging the surface of the roll itself directly opposite the point of contact with the grinding wheel, thus avoiding the necessity of chucks and gripping mechanisms. The rolls, placed in the magazine *A*, are received one by one by the carrier *B*, which automatically advances them to the grinding position. Here they are in frictional engagement by a driving roll and at the same time are ground by the abrasive wheel *C*, which is automatically advanced and retracted as each roll is presented to it. The completed rolls are discharged from the carrier and removed from the machine by a conveyer at point *D*.

[6] U. S. patent No. 1,974,696, Sept. 25, 1934.
[7] U. S. patent No. 1,974,508, Sept. 25, 1934.
[8] U. S. patent No. 1,977,563, Oct. 16, 1934.

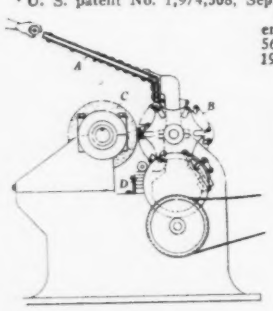


Fig. 5. Wringer Roll Grinder

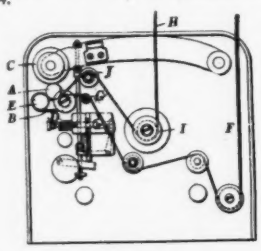


Fig. 6. Winder for Golf Balls

Golf Ball Winding Machine

The golf ball winder[7] here illustrated winds resilient cores by continuously rotating a spherical center and first winding upon it a wide elastic thread and then a fine elastic thread or overlapping the winding of 2 threads throughout any predetermined zone in the body of the core. The core center *A* is supported upon and rotated by an endless belt *B*, which runs on a driven roller *D* and an idle roller *E* and is engaged by a freely rotating detector disk *C*. The wide elastic thread *F* for the inner winding of the core is supplied from a reel and delivered to the core center by guide wheels. The guide roller *G* directs the thread to the core at a point adjacent to the lower side of its circumference so that it passes between the surface of the driving belt and the core.

The fine elastic thread *H* also passes from a reel and is directed to the core by passing about the roller *I* of a tension device and a guide roller *J*, which directs the fine thread to the core symmetrically upon the wide elastic thread. In winding the core the ends of both threads are brought together and started simultaneously and the initial step may thus be continued up to any desired diameter of core.

Hose Vulcanizing Machine

This continuous vulcanizer is for making rubber hose, belting, etc. The apparatus[8] comprises a vulcanizing chamber *A* through which the hose *B* passes for vulcanization encased in a set of endless steel ribbons *C* and *D*. After leaving the support *E* the ribbons return to the opposite end of the machine through a pair of tubes *F* and *G* and again enter the vulcanizing chamber.

The hose is tightly bound by the encasing ribbons as it passes through a closely fitting tube set central with the axis of the vulcanizing chamber. The encased hose is drawn through the apparatus by a series of friction grip devices *H*, *I*, *J*, *K*, and *L*, of which *H* is fixed. The others are connected by a system of levers to a motor designed to impart to each a synchronized reciprocal motion such that they grip and pull the encased hose steadily forward until it emerges at *E*, where it is released automatically.

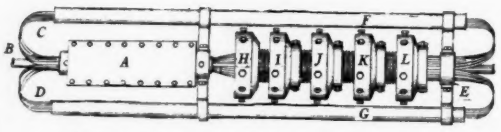


Fig. 7. Continuous Vulcanizer for Hose

Ammonia Curing Apparatus[9]

Rubber articles may now be cured in small or large increments with conservation of gas, time, labor, and forms, by means of a specially designed cylindrical tunnel vulcanizer fitted with communicating, pressure equalizing, loading and unloading end chambers. These chambers have apertures at the bottom through which loading and unloading are accomplished by means of lifts. These are so constructed as to carry the conveyer-like trucks and serve as closures for the chambers.

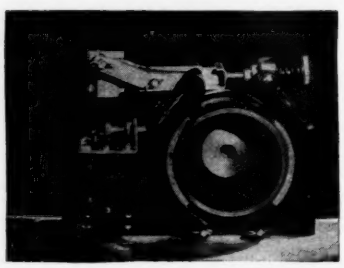
[9] U. S. patent No. 1,981,194, Nov. 20, 1934.

Small Solenoid Operated Brake

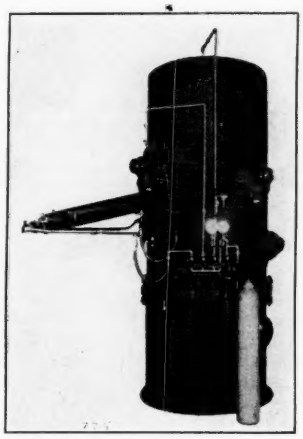
A NEW line of small A.C. and D.C. solenoid operated brakes is here illustrated. Three brake sizes are included, with torque ratings ranging from 3 to 75 pounds-feet. These ratings are in accordance with NEMA standards and conform closely to the full load torque ratings given for small standard motors.

The brake wheel is relatively large, allowing low total brake shoe pressures which, distributed over the large brake lining area, result in low unit pressure on the lining and, therefore, long, even wear of the friction surfaces. The low shoe pressure also results in low stresses on all pins and pivot points, assuring longer wear for these parts, and allows the use of a small operating solenoid which requires less current, thereby effecting a slight saving in the operating costs of the brake.

Dimensions of the A.C. and D.C. brakes are interchangeable so that machine designers can provide standard mounting holes and apply either the A.C. or D.C. brake as needed. Brake shoes use molded brake lining and provide 180° braking service. These brakes are intended for applications on machine tools, conveyers, small hoists, dumbwaiters, overhead door hoisting equipment, small elevators, and similar small machines where quick, sure stops are required. Cutler-Hammer, Inc., 12th and St. Paul Ave., Milwaukee, Wis.



Cutler-Hammer Small Electric Brake



Robertson Melting Pot

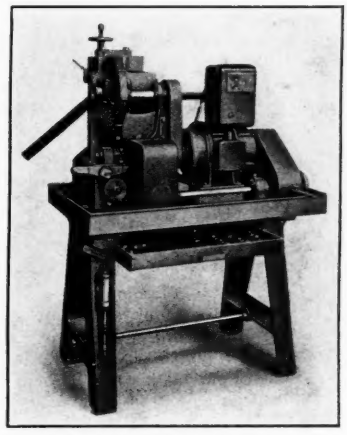
Closed Lead Melting Pot

THE lead melting pot pictured is shown as installed in a cable manufacturing plant. The pot is closed with the exception of a small opening or tube through which pigs of lead are supplied. The equipment is arranged to use inert gas over the lead to prevent excessive formation of oxides. The lead delivery valve and pouring spout are closed and provided with connections so that they may be flushed out and the lead stream be surrounded with inert gas as it is delivered to the extrusion press.

This pot, of welded steel construction, is equipped with 2 valves. One is used when delivering lead to the press, and the other to drain the pot dry when changing the metal from one alloy to another. This equipment may be heated with either oil or gas. The furnace is thoroughly insulated for fuel economy. The main object in the design of this pot is to produce better cable sheath by keeping down the formation of oxides as far as possible during the pouring operation. John Robertson Co., Inc., 121-37 Water St., Brooklyn, N. Y.

Small Washer Cutter

THE newest automatic machine for cutting small washers is represented in the accompanying illustration. This motor driven machine is particularly



Thropp Automatic Small Washer Cutter

adapted for cutting all kinds of washers. It cuts most rapidly and holds its accuracy longer on account of being equipped with ball and roller bearings, longer wearing parts, and Alemite lubrication system.

The machine will cut washers of diameters from ¼-inch to 1¾ inches inclusive and from $^{3}/_{32}$- to 1½-inch in length. It has 3 changes of gears on the feed rolls and 2 changes of compound gears. A hand wheel at the top adjusts both feed rollers at the same time, and 2 ratchets give almost all size cuts. The knife is 10 inches in diameter and runs 2,504 r.p.m. One hundred cuts per minute of large diameter long lengths and 200 per minute of small diameter short lengths can be made.

The machine is equipped with a G.E. ¾-h.p. gear head motor, 2 or 3 phase 220 or 440 volts, 60 cycles (standard) and magnetic switch with push button in the cover for starting and stopping. Also over-load and under-voltage protection is built in the machine and wired to the motor. Wm. R. Thropp & Sons Co., Trenton, N. J.

Comb Sawing Machine

THE machine pictured is for sawing teeth in dressing combs of celluloid, horn, or rubber, either straight or curved at their base. The machine feeds and stops automatically.

A weight draws the comb down upon the saw. After the cut is made a cam raises the comb from the saw and carries it along the space of one tooth by means of the cam and a rack. This operation continues until the number of teeth required have been sawed when the machine stops automatically. The rack and the cam can be removed and others substituted if a different length or number of teeth per inch is required.

This machine is usually operated in pairs, one for sawing the coarse and the other the fine teeth of a dressing comb. Standard Tool Co., 75 Water St., Leominster, Mass.

Bias Fabric Roll Winder

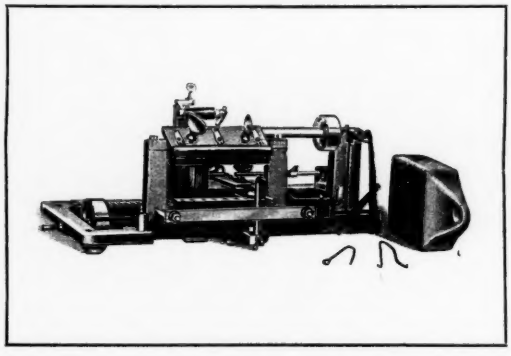
THE machine shown in the accompanying illustration is a combination winder and cutter designed to wind yardage of bias fabric on shells for subsequent cutting into rolls of any desired width. The straight fabric is prepared for the winder by laying it in as many thicknesses as desired on a bias cutting table. The clamped down goods are then cut through by a pattern cutter or hand knife into 45° bias blocks. These diamond sections are united by zig-zag stitching on a sewing machine ready for rolling on to a shell.

The fabric, being drawn from below into the machine, is guided and kept smooth by advancing over a series of tension bars and finally is wound on a shell at the top of the machine. Fabric Machine Co., Inc., 307 Center St., Bridgeport, Conn.

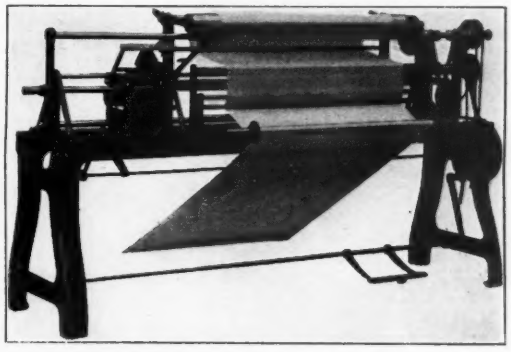
Rubber Tensile Tester

MODEL L-P rubber tensile tester here pictured is so designed that a maximum of machine value is obtained. It embodies no radical changes, but retains most of the features which made Model L-3 of the same manufacturer the accepted world standard of its type for accuracy of results, efficiency, convenience, economy of operation, and safety of the operator.

A score of important features combine to make this machine unique in the matter of completeness as an apparatus for testing the tensile properties of rubber. Briefly enumerated, the most important of these features follow: heavy construction of head, frame, and supporting base; lever mounted on



Standard Dressing Comb Sawing Machine



Combination Bias Roll and Fabric Cutter

completely housed precision ball bearings; dead-weight lever operation; stress-strain recording chart; heavy resistance weight close to bearings and short lever for greater sensitivity; spark type stylus adjustable for recording data of many samples; multiple pawls (6) in connection with 12 rack teeth per inch to eliminate "drop back" when test specimen is broken; large easily read dial scale; standard Z-1 clamps; new transparent elongation measurement scale serving also as a guard against possible injury to operator and promoting convenience.

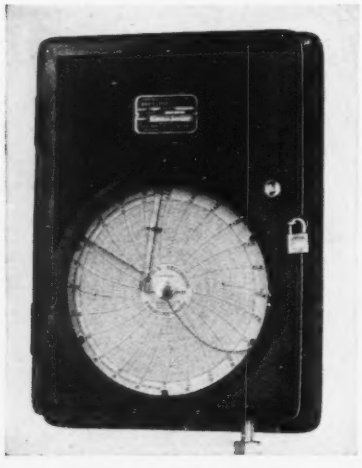
Other features that insure efficient operation are: accessibility of coil spark and control button; transformer for spark coil eliminates batteries; the lower clamp on a substantial support moves downward at the standard rate of 20 inches per minute; a stainless steel flexible drawbar reels up in the gear box; the pulling bar returns instantly to its starting position on completion of test; gear box of simple design is extremely quiet in operation.

The machine is operated by ¼-h.p. motor attached to light circuit, and a great range of speed of pull is made possible by the V-type belt drive. The foot treadle controls are a convenience for the operator, and the heavy iron base saves expense of installation as no fastening to wall or floor is required. Henry L. Scott Co., 101 Blackstone St., Providence, R. I.

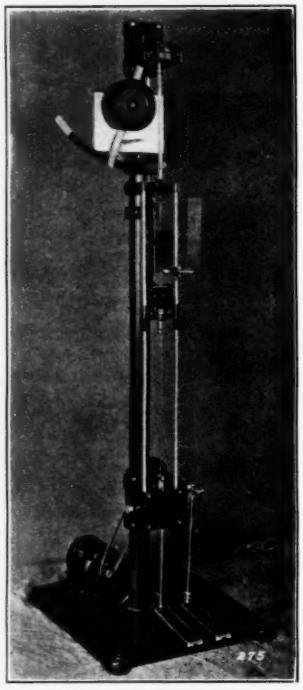
Recording Absolute Pressure Gage

A NEW direct reading absolute pressure gage of the recording type here pictured has been recently developed. It is a recording vacuum gage compensated for changes in barometric pressure and also for changes in temperature. It, therefore, reads direct in pressure absolute. A need has developed in many processes for a direct reading recording type of absolute pressure gage which can be used by miscellaneous operators and practical men and read direct without confusing their minds or being delayed by any necessity of applying barometric or temperature corrections.

The gage illustrated is equipped with 2 measuring elements, coordinated through a special differential transmitting linkage of ingenious design. One measuring element is connected to the vacuum line, and the other functions in connection with the compensating features of the recorder. This instrument can be furnished for ranges as low as 25 millimeters head of mercury absolute pressure or its equivalent and is available in rectangular form case of wall type or flush type design. The Bristol Co., Waterbury, Conn.



Bristol Recording Absolute Pressure Gage

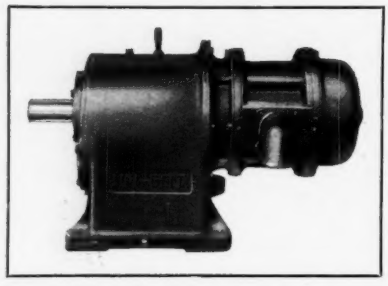


Scott Rubber Tensile Testing Machine

Motorized Helical Gear Reducers

THE motorized helical gear reducer illustrated is designed for the greatest compactness and economy in self-contained enclosed speed reducing units. A standard round-frame motor is secured firmly to the side of the reducer housing by means of an adapter casting which supports the motor shaft in oversize anti-friction bearings close to the pinion, thus assuring good alinement and proper mesh of pinion with its mate. The complete motor, with adapter and motor pinion, may be removed as a unit for inspection or maintenance, without disturbing the alinement of the motor or of the gears remaining in the reducer housing.

All gears are of the helical type, with teeth cut from heat-treated alloy steel. Anti-friction bearings are used throughout. The low speed shaft and its bearings are designed to carry overhung loads. A well-braced and ribbed gray iron housing provides a rigid mounting for the bearings, shafts, and motor as well as constituting a liberal sized reservoir for automatic lubrication of the gears and bearings. Seals are provided at shaft openings to keep the oil in the housing, and the grit and dirt out. Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

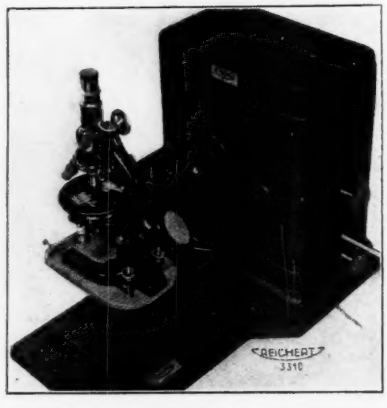


Link-Belt Motorized Reducer

The Fluorescence Microscope

THE fluorescence microscope is used to study dispersion of fillers, effect of milling on dispersion, effect of fillers on quality, the changes in the structure of the rubber during curing, the solubility of zinc oxide in presence of fatty acids, the action of accelerators and other constituents in a mix, the quality of ingredients, etc.

In the examination of latex compounds the ordinary microscope shows only a black and white picture of an agglomeration of particles of fillers, and only laborious chemical analysis of the preparation would reveal the details of the composition of the mix. But with the aid of the fluorescence microscope the practiced operator sees at a glance what the mixture contains. Systematic study with this new method aided by apparatus for measuring the intensity of the fluorescent light, as where substances show the same color, and setting up of standard samples will do much toward advancing and simplifying control of materials by the microscope. G. Jarre, P. Jacquin, successor, 18 Rue Pierre-Curie, Paris, France.



Reichert Fluorescence Microscope

Rubber Industry in America

OHIO

THE outlook for business in the rubber industry is better, and manufacturers expect the first half of 1935 to surpass that of 1934. But the decision of the United States Supreme Court on control of oil shipments and the uncertainty prevailing regarding its opinion on the administration's gold program have adversely affected business.

Pay increases averaging 5¢ an hour for nearly 40,000 rubber workers recently went into effect. Factory workers at Goodyear, Firestone, and Goodrich were benefited by the increases, which it is estimated will add about $2,000,000 to their pay envelopes this year. Salaried office employes at Goodyear and Goodrich, in most cases, will also receive a 5% increase February 1.

Mansfield Tire & Rubber Co., Mansfield, basing its beliefs on current business conditions, expects to continue production at present capacity during 1935. The possibility is strong, according to President G. W. Stephens, that by spring factory workers will be given full-time employment, but the company does not expect to increase its present working force.

A. Schulman, Inc., dealer in crude and scrap rubber, 608 Akron Savings & Loan Bldg., Akron, being overcrowded in its present quarters, has taken a new warehouse at 575-77 S. High St., Akron, a brick building having a floor space of over 25,000 square feet all on one floor. Offices, however, will remain at the downtown address. The firm has been very busy at the warehouse handling many carloads of scrap and crude as it carries a large tonnage of all grades on hand for spot delivery.

Seiberling Rubber Co., Akron, through J. Penfield Seiberling, vice president and sales manager, reported that the growing volume of automobile sales in anticipation of the Ohio sales tax has resulted in an unprecedented rise in tire sales. Mr. Seiberling further states that his company in November, 1934, experienced its largest month of sales in 12 years. A 40% increase in business was shown at the end of 1934, and Seiberling expects a notable gain in all subsidiary automobile fields to give 1935 a better record. Mr. Seiberling is making an inspection tour of company distributers in Ohio, Kentucky, and Indiana.

The Rubber Service Laboratories Co., manufacturer of chemicals for the rubber industry, recently moved its sales and service offices from 611 Peoples Savings & Trust Bldg., Akron, to 1012 Second National Bldg.

Goodrich Activities

The B. F. Goodrich Co., Akron, is manufacturing for United Air Lines de-icers, ice removing equipment that automatically clears ice off airplane wings and tail surfaces. The entire United coast-to-coast fleet will be equipped with these de-icers.

"To make any reasonably accurate forecast of the automobile tire industry for 1935 it is essential to consider the constant improvements in tire manufacture as well as the estimated car registration," declared C. B. O'Connor, Goodrich general tire sales manager. "Average car registrations for 1927-28-29, a period of good business conditions, approximated 23,200,000 cars buying annually 49,600,000 tires or 2.14 tires per car. Since then manufacturers have produced improved tires capable of giving constantly greater mileage. With car registration estimated at 24,700,000 for 1935 it is expected that tire replacements will approximate 33,000,000 during 1935, or 1.32 tires per car. As tires are constantly being improved in quality, increased car registration in 1935 may not be fully reflected in the tire industry despite generally improving economic conditions."

Mr. O'Connor also announced the appointment, effective January 1, of E. P. Weckesser, sales executive of the Associated Tire Lines division, to the automobile tire division.

M. G. Huntington, advertising manager of Associated Lines, was transferred to the sales department as manager of sales promotion and budget selling activities.

H. E. Keller, sales manager of Associated Lines, has named L. T. Greiner, formerly assistant to Mr. Huntington, as advertising manager of the division.

A recent election, the result of petitions of a large number of Miller employes for representation under the Plan, placed the Goodrich Cooperative Plan in operation for Miller plant factory employes. L. M. Hager was elected president of the Miller group. The Miller office group has already been included in the Goodrich Cooperative Plan for office workers, which has been in successful operation several months.

The General Tire & Rubber Co., Akron, at its annual stockholders' meeting January 15 reelected officers and directors as follows: president, Wm. O'Neil; vice president, C. J. Jahant; vice president and secretary, W. E. Fouse; treasurer, Charles Herberich; assistant treasurer, T. Spencer Shore; assistant secretary, Hayes Jenkins; and directors, Messrs. O'Neil, Jahant, and Fouse, G. F. Burkhardt, T. F. O'Neil, J. A. Diebold, and J. R. Kraus.

Goodyear Tire & Rubber Co., Akron, has transferred General Superintendent Edwin J. Thomas to its plant in Wolverhampton, England. Prior to his appointment as general superintendent in October, 1932, he had been assistant factory manager. E. L. Mefford, branch manager at Columbus, has been made manager of the Cleveland branch. He is succeeded in his former post by A. M. Bowyer. C. R. Langdon, recently appointed manager of the Cincinnati branch, succeeds A. R. Ruplin, transferred to the petroleum sales division of the company in Akron. Mr. Langdon formerly had been Goodyear branch manager in Sacramento, Calif.

Master Tire & Rubber Corp., Akron, through President R. P. Bremer has announced that all tires and tubes of the corporation are being manufactured at the plant of one subsidiary, Cooper Tire & Rubber Co., Findlay, as the plant of another subsidiary, Falls Rubber Co., Cuyahoga Falls, has been shut down over a year. The Cooper factory

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Firestone Float That Won Second Prize at the Tournament of Roses Parade, Pasadena, Calif., January 1, 1935

NEW ENGLAND

AT PRESENT the rubber trade in New England is enjoying much better business than it had 2 or 3 months ago. Future prospects are encouraging. Spring dating in the tire industry has led to increased sales and production. Cotton flock manufacturers report that business with the rubber industry is about normal compared with that in the same period of 1934. A pick-up from present levels is expected, however, between now and late spring. Many inquiries for new mold equipment are being received, but the number of orders placed is less than that of a year ago.

Executives of Rhode Island rubber goods plants believe operations during 1935 will surpass those of 1934, for, it is claimed, a more encouraging tone prevails as the plants swing into their 1935 production schedules. Perhaps the outstanding factor in the industry locally is the strong position of inventories, both as regards the manufacturers and the wholesale buyers. This improvement may be laid to 2 factors: the hand-to-mouth buying policy that prevailed in the past year or more and the larger volume of business done in many lines during the recent active Christmas buying season. Because inventories are in such a favorable position executives feel that any substantial pickup in demand would be quickly reflected in plant operations. Rubber goods plants have also followed the policy of keeping stocks of crude materials at a moderate level, and a real rise in business would necessitate replenishment of supplies.

In the rubber sundries division the dollar volume in the current year is expected to run about 10% above that during 1934 when the level of operations was estimated to be a like advance over that for 1933. Employment in this division is now slightly above that of December, 1933, and January, 1934. Makers of hospital and surgical supplies report that during December manufacturing demand had sharply fallen off and not until the opening weeks of January did buying begin to show signs of gaining. The threat of Japanese imports to the domestic producers is said still to be a source of worriment. Local executives report having met with little success in efforts to bring their problems to the attention of the proper officials at the nation's capital.

While some increase in employment is normal in the general division of the rubber goods industry, during the first month of 1935 the rise is said to be slightly more than seasonal. Local plants are now busy producing sport goods for the spring and summer trade. Although the number of employed has shown little increase, some departments, which were on shortened hour schedules, have stepped up production, giving more hours of work per week to employes.

The outlook is said to be particularly good in the field of industrial tank and tank car lining. Orders placed for this product by several large industrial corporations are encouraging in that they signify greater willingness on the part of these concerns to spend money for new materials. The rubberized thread division of the industry continues operating at a satisfactory level.

Plant executives in all divisions of the rubber goods industry continue to display a cautious policy in the matter of forward planning, in most cases preferring not to commit themselves for more than a month or so in advance. Their attitude reflects their uncertainty over coming events, and according to some sources this feeling is evident all along the line through wholesale and retail establishments. However the sentiment on the whole is distinctly encouraging, with plants awaiting replenishment orders from buyers who have finished their year-end inventory taking.

The United States Army awarded contracts for 211,000 pairs of rubber boots and overshoes, totaling over $350,000, to several firms including United States Rubber Co., Naugatuck, Conn.; Hood Rubber Co., Watertown, Converse Rubber Co., Malden, Firestone Footwear Co., Boston, and Tyer Rubber Co., Andover, all in Mass.; and Lambertville Rubber Co., Lambertville, N. J.

Hood-Goodrich Footwear Advertising Man

An interesting and varied career has been the lot of Paul N. Swaffield, advertising manager of Hood Rubber Co., Inc., and of The B. F. Goodrich Co., Footwear Division, both in Watertown, Mass. He was born in Everett, Mass., May 5, 1894. His education was received at Peddie (Prep) School, Hightstown, N. J., and Brown University, Providence, R. I. When he was graduated from the latter in 1916, he was the possessor of a Ph.B. degree.

Paul N. Swaffield

In his efforts to earn a livelihood he secured employment at the Boston, Mass., branch of the United States Rubber Co., working there 3 years as stock and order clerk and salesman. During the World War, Mr. Swaffield served in the artillery division of the U. S. Army. Then for 3 years he was athletic director and coach of all sports in high and preparatory schools of New England.

Later he again was attracted to the rubber industry and started with the Hood company in its factory methods department. His ability won him advancement, and he became manager of the athletic footwear department (designing and selling), then sales promotion manager, and finally advertising manager.

Meade Rubber Co., rubberizer of fabrics, Stoughton, Mass., announced that the damage done by the explosion on December 28 was repaired and the plant went into full production January 2.

Naugatuck Chemical chemists are attending night school. The Board of Education of Naugatuck, Conn., at its night school this year started a class in elementary chemistry conducted by the high school chemistry teacher, which has attracted, among others, about 15 or 20 employes from the Naugatuck Chemical organization. At the request of the men themselves a second class, held 2 evenings each week, was arranged under the auspices of the school, but instructed by one of the organic chemists of the company. This course in elementary organic chemistry is for those men who have had some chemistry and wish to continue their studies. Attendance numbers between 15 and 20. Last fall Naugatuck Chemical chemists and engineers with college training organized a study group of their own, averaging between 25 and 30 participants, which is conducted as a seminar class. At each weekly meeting a paper is read by a different member of the gathering, and subjects cover all phases of chemical activity from theoretical discussions to practical applications. J. P. Coe, factory manager of Naugatuck Chemical, has arranged a series of lectures for the benefit of the entire organization. These lectures, held monthly, are open to all employes. The subjects are somewhat general in character, but relate particularly to the firm's own business. About ⅔ of the entire personnel went to the last meeting.

(Continued on page 58)

EASTERN AND SOUTHERN

RUBBER goods production is rated very active, especially in tires, tubes, footwear, mechanicals, and sundries. Insulated wire output is restricted because of slackness in building construction. Heel and sole manufacturers have engaged in such keen competition that they are constrained to seek a general increase of prices in their lines. A much more optimistic opinion prevails now than was evident this time last year. Manufacturers of testing machines, though, report present business is not of the best, but according to inquiries for future orders, it should improve. It is also believed that when the automobile industry gets into full swing with its new models, it will have a material booming effect on the rubber trade.

It has been reported that many consumers of rubber, along lines in which one would never believe rubber was of any importance, such as steel works and the like, are not only using considerable rubber, but are becoming more and more particular about the physical properties and suitability of this material for their special fields.

American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., recently organized a Canadian company, North American Cyanamid, Ltd., to operate the plants at Niagara Falls, and Beachville, Ont., Canada. The new firm will also handle the marketing of the products of these plants in Canada and countries outside the United States.

Titanium Pigment Co., Inc., 111 Broadway, New York, N. Y., has added to its eastern sales staff J. J. Williams, formerly with the Flint Paint & Varnish Co., Toronto, Ont., Canada.

Imperial Oil & Gas Products Co., Union Bank Bldg., Pittsburgh, Pa., offers Supreme carbon black to the consideration of rubber compounders. During production it is constantly laboratory tested to the particular needs of the rubber industry and made to meet the most exacting specifications.

Franklin Rubber Corp., Doylestown, Pa., now operates with a full force in making plumbers' supplies. The company some time ago took over the plant of the Rubber Products Corp. and increased the working force.

Vulcanized Rubber Co., Morrisville, Pa., resumed operations after the usual winter shutdown of a few days to take inventory.

Binney & Smith Co., 41 E. 42nd St., New York, N. Y., has announced the appointment to its Rubber Chemicals Division of Charles R. Haynes, who will do technical service work. Mr. Haynes is well known in the rubber industry by reason of his long and varied service in it, including footwear, mechanicals, and latex. He was formerly factory manager of the Boston Rubber Shoe Co., and his more recent

Charles R. Haynes

association was with the United States Rubber Co., 1790 Broadway, New York, N. Y., in its purchasing department; then on latex development at Naugatuck Chemical; and later in the hose development department in Passaic, N. J.

Rubber Code News

Official NRA Orders

Code No. 156: Order 57, granting exemption to The B. F. Goodrich Co., Akron, O., from the provisions of Chapter I, Article V, Section 1 of the Code, to the extent that it may employ 3 persons unlimited hours, provided that such employes shall be paid 1⅓ times their regular rates of pay for all hours in excess of 8 hours in one day, or 40 hours in one week. The order also provides that a copy shall be posted in a place readily accessible to all employes affected thereby, and that it shall be effective only with respect to work being done by this company under a contract with the United Air Lines for the installation of de-icing equipment on 30 transport airships.

Code No. 174: Order 17, denying application of McCreary Tire & Rubber Co., Indiana, Pa., for exemption from the provisions of Article IV-a, Sections 1 and 2 of the Code.

Code Authority Members

The following code members have been elected:

Retail Rubber Tire and Battery Trade: A. E. Oliver, Albert E. Oliver, Inc., Albany, N. Y., eastern geographical regional representative; Martin J. Barry, Baltimore, Md., Atlantic geographical region representative; W. J. Coughlin, The General Tire Co., Indianapolis, Ind., central geographical regional representative; Harry H. Brooks, Brooks Shatterly Co., Atlanta, Ga., southern representative; Jesse G. Johnston, Johnston Bros. Tire & Service Co., St. Louis, Mo., western representative; A. B. Chapman, Guasti-Giulli, Inc., Los Angeles, Calif., Pacific representative, all members of the independent dealer group; W. W. Humphrey, Western Auto Supply Co., Kansas City, Mo., mail order, chain store, and department store member; A. E. Caldwell, Atlas Supply Co., Newark, N. J., petroleum products distributers member; and L. R. Jackson, The Firestone Tire & Rubber Co., Akron, O., company owned stores member.

Automobile Fabrics, Proofing, and Backing Division: M. I. Woythaler, chairman, Framingham, Mass.; J. T. Callahan, Milford, Mass.; R. M. Freydberg, Brooklyn, N. Y.; J. D. Lippmann, Toledo, O.; and W. H. Jenks, representing Reading Rubber Mfg. Co., New York, N. Y.

Rubber Footwear Division: J. S. Muffley, Endicott, N. Y., to serve for a term of one year from August 14, 1934; and C. E. Little, Rock Island, Ill., to serve for a term of one year from November 14, 1934.

The Commodity Exchange, Inc., 81 Broad St., New York, N. Y., through its board of governors on January 23 reelected Jerome Lewine president. Floyd Y. Keeler was named treasurer; and the following, vice presidents: J. Chester Cuppia, Edward L. McKendrew, Charles Muller, Ivan Reitler, and Charles Slaughter.

Watson-Standard Co., Pittsburgh, Pa., manufactures Plicote, which is derived from crepe rubber and recommended as a coating resistant to acids, alkalies, brines, oils, and greases.

Columbian Carbon Co., 45 E. 42nd St., New York, N. Y., elected R. L. Carr vice president to succeed the late Edwin Binney.

L. A. Dreyfus Co., Pier 23, Rosebank, Staten Island, N. Y., manufactures a diversified line of gutta percha compounds for a variety of purposes such as adhesives, insulation, backing, sealing, and friction materials.

The Sixth Annual Greater New York Safety Conference will be held at the Pennsylvania Hotel, New York, N. Y., March 5, 6, and 7. For further information communicate with Julien H. Harvey, manager, New York office, National Safety Council, 9 E. 41st St.

Hewitt Rubber Corp., 240 Kensington Ave., Buffalo, N. Y., through General Manager Thomas Robins, Jr., predicts its business this year will be even better than in 1934, which was 25% greater than in 1933. The firm's average employment of 400 workers in 1934 was the best since 1930. As evidence of increased business Mr. Robins cited the resumption of preferred stock dividends in 1934, the first payments since December, 1930.

Kelly-Springfield Notes

On January 11 the following permanent receivers were appointed for the Kelly-Springfield Tire Co., 405 Lexington Ave., New York, N. Y., and Cumberland, Md.: Daniel T. O'Regan, prosecutor of Hudson County, N. J.; Frank C. Ferguson, president of the Hudson County National Bank and chairman of the Port of New York Authority; Edmund S. Burke, Kelly-Springfield president; and Alexander Weinstein, New York industrial engineer.

Later a reorganization of the company was effected with the election of the following new officers of the company: president, Mr. Ferguson; vice presidents, Mr. O'Regan and Joseph F. O'Shaughnessy; and Mr. Weinstein, secretary-treasurer. Mr. O'Shaughnessy was formerly vice president and general manager of the tire department of the United States Rubber Co., 1790 Broadway, New York, N. Y.

This reorganization followed dissolution of a federal receivership.

A committee was formed for the protection of holders of the 10-year 6% subordinate notes of the Kelly-Springfield Tire Co. The committee, of which W. B. Stratton is chairman, has asked the holders to send their names to it so that it may be in a position to communicate with them. George Peabody, former director of the company, also is a member of this committee.

Formation of a protective committee for holders of $6 preference stock of the company was announced January 17. The new group, headed by Spruille Braden, includes John I. Merritt and Walter Barnum. Other members are to be elected later. The secretary is F. G. MacLean, 25 Broad St.

St. Joseph Lead Co., 250 Park Ave., New York, N. Y., manufacturer of St. Joe zinc oxides, announces a series of 9 illustrated advertisements on phases in the production of St. Joe zinc oxide; the first is entitled "Mining."

Carlisle Tire & Rubber Co., Carlisle, Pa., has increased production and employment to full capacity as a result of new orders. The concern now operates 24 hours a day with 3 shifts. Secretary M. L. Dunkleberger said the firm expects to arrive at a daily production of 25,000 tubes and hold to that schedule.

Father Julius A. Nieuwland, of Notre Dame University, has been awarded a gold medal by the American Institute for his basic work in the development of synthetic rubber. The presentation of the medal will take place at the annual dinner of the American Institute to be held in the Hotel Astor, New York, N. Y., February 7.

Ernst A. Hauser, prominent European rubber technologist who has been visiting this country and lecturing on latex at different meetings of chemists, through these columns wishes to thank all those with whom he came in contact here for their many courtesies, hospitalities, etc. Dr. Hauser expects to be in America again this coming fall.

Greetings, Calendars, and Souvenirs

The personnel of India Rubber World acknowledges with thanks the following holiday mementos.

The Akron Equipment Co., E. Exchange St., Akron, O., gave a neat little metal case containing 3 screw-drivers in one.

A useful and interesting pocket memorandum book came from John Royle & Sons, Paterson, N. J.

Attractive cards bearing holiday greetings were sent by Maurice S. Azulay; Binney & Smith Co., 41 E. 42nd St., New York, N. Y.; The Cleveland Liner & Mfg. Co., Cleveland, O.; Barthold De Mattia, Clifton, N. J.; General Atlas Carbon Co., 60 Wall St., New York; John Helfrech; Robert E. Powers, of The B. F. Goodrich Co., Akron; Joseph Rossman; Shiraishi Kogyo Kaisha, Ltd., Osaka, Japan; Foster D. Snell, Inc., Brooklyn, N. Y.; and James H. Stedman, 5550 Cote St. Luc Rd., Montreal, Canada.

Good-looking wall calendars were forwarded by General Electric Co., Schenectady, N. Y.; Heveatex Corp., Melrose, Mass.; Link-Belt Co., 2045 W. Hunting Pk. Ave., Philadelphia, Pa.; National Rubber Machinery Co., Akron; Northwestern Rubber Co., Litherland, Liverpool, England; The Oak Rubber Co., Ravenna, O.; The Rubber Service Laboratories Co., Akron; C. K. Williams & Co., Easton, Pa.; and Albert Peretti, Milan, Italy. This last calendar was most unusual for the picture showed a tapping scene printed on a sheet of crepe rubber.

I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., the early morning of January 2 had a fire in one of the acid rooms of its plant at 127th St. and Fourth Ave., College Point, L. I. Some of the merchandise in departments below the acid room was damaged by smoke and water. Repairs were completed about 10 days after the fire, according to Treasurer C. Mergentime. The plant soon resumed normal operations, and no delay was encountered in making deliveries to customers.

The New Jersey Zinc Sales Co., Inc., 160 Front St., New York, N. Y., recently purchased from the estate of Ralph E. Potter, who was associated with the firm for many years, the business and good will of David Randall & Co., and will continue this business in the name of The New Jersey Zinc Sales Co. Until further notice the company will operate from the same Boston, Mass., address, 55 Kilby St., and through the same Boston warehouse, the Albany Terminal Stores, with which customers are already familiar as a result of dealings with Mr. Potter and David Randall & Co. in connection with their products. George W. Harragan, who, starting the early part of 1934, assisted Mr. Potter while the latter was ill, will continue as New England representative.

R. M. A. Meeting

The twentieth annual meeting of The Rubber Manufacturers Association, Inc., was held January 7, 1935, in the Assembly Rooms of the Waldorf-Astoria Hotel, New York, N. Y. The following officers and executives were elected: chairman of the board of directors, Col. A. F. Townsend, Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.; president, A. L. Viles, Rubber Manufacturers Association; executive committee, George B. Dryden, Dryden Rubber Co.; C. C. Slusser, Goodyear Tire & Rubber Co.; H. E. Smith, United States Rubber Co.; Colonel Townsend and Mr. Viles; secretary, R. H. Goebel; assistant secretaries, K. B. Anderson, C. S. Dickey, W. L. Finger, George Flint, A. C. Grimley, C. W. Halligan, A. D. Kunze, and W. G. Manley; treasurer, W. H. Blackwell, United States Rubber Products, Inc.; assistant treasurer, W. H. Dunn, Manhattan Rubber Mfg. Division.

The following directors were elected for the 1935 to 1938 period: Mr. Dryden; A. B. Newhall, Hood Rubber Co., Inc.; E. B. Germain, Dunlop Tire & Rubber Co.; Wm. O'Neil, General Tire & Rubber Co.; Jas. D. Tew, The B. F. Goodrich Co. Director for one year, E. S. Burke, to take the place of Wm. H. Lally, resigned.

MIDWEST

FOR the past 3 months rubber manufacturers in the Midwest have been fairly busy. While they experienced quite a slump during the past summer, their business has improved steadily since October 1 to good volume at present. Prospects are that this state will continue for the next few months at least. Orders continue to be comparatively small in individual volume, but are plentiful in number. Manufacturers feel that there will be some advance in selling prices to keep pace with the rising costs of crude materials, labor, and production.

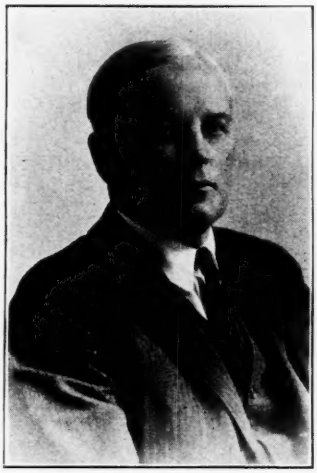
American Container Corp., Rock Island, Ill., manufactures rubber battery containers. A. O. Fuhrmann is chemical engineer.

Underwriters' Laboratories at a special meeting of the directorate in Chicago, Ill., on January 7 elected Vice President A. R. Small president to succeed the late Dana Pierce.

Illinois Testing Laboratories, Inc., 424 N. La Salle St., Chicago, Ill., manufactures the "Alnor" Pyrocon for taking temperatures of flat, stationary, or moving curved surfaces.

The Industrial Equipment Co., Inc., 140 W. 22nd St., New York, N. Y., of which I. Fried is president, recently established a rubber machinery sales department, of which Edward Hutchens is western manager, with headquarters in Cudahy, Wis. The company contemplates opening also a warehouse in the Midwest to serve the trade in that territory.

OBITUARY



David R. Bowen

Farrel Vice President

DAVID REES BOWEN, a vice president and a director of Farrel-Birmingham Co., Inc., Ansonia, Conn., and for 45 years its chief engineer, died at his home in Ansonia, December 29, 1934. He was born in Cwmavon, Wales, October 22, 1865, and attended the British National Schools and Llandovery Collegiate School.

When he was 17, he came to the United States with his parents and in 1883 joined the Farrel Foundry & Machine Co. as a machinist's apprentice. After 3 years he became a machinist, and 2 years later entered the drafting room of the company. Ten years later he was made chief engineer, a position he held until 1930, when he was elected vice president in charge of engineering. In July, 1933, ill health compelled him to relinquish active direction of engineering, and he became consulting engineer, continuing also as vice president until his death.

Mr. Bowen belonged to the American Society of Mechanical Engineers, the Masons, and the Elks. He took an interest in civic and community affairs, serving as alderman of Ansonia and member of the board of trustees of the Ansonia Public Library. He was also a vestryman of Christ Episcopal Church.

Mr. Bowen leaves his wife, a son, a daughter, and 2 grandchildren.

Funeral services were conducted at his late residence on December 31. Burial was in Pine Grove Cemetery, Ansonia.

Hard Rubber Expert

FIVE years of ill health culminated in the death of Francis Charles Dilzer, 66, of Belleville, N. J., on Christmas Day. He had a wide experience with hard rubber, gained by the following connections: American Hard Rubber Co., Butler, N. J., 1886 to 1902 and 1918 to 1923; Hardman Rubber Co., Belleville, 1902 to 1906; Pyralin Celluloid Co., Arlington, N. J., 1906 to 1918; Seamless Rubber Co., New Haven, Conn., 1923 to 1927; and Droecher Rubber Co., Cranford, N. J., 1928. For 4 months during 1918 Mr. Dilzer worked for a corset firm in New Haven and later had his own factory in Newark, N. J., where he covered corset steel with celluloid. Much of his time was spent traveling as a technical hard rubber expert and as consultant on the installation of hard rubber manufacturing machinery. He also perfected a number of hard rubber manufacturing processes.

Mr. Dilzer, who was born in Hibernia, N. J., where he attended parochial school, belonged to the Royal Arcanum Lodge.

He leaves his wife and 3 daughters.

Thermoid Salesman

WILLIAM H. KOONS, 43, for many years a salesman for The Thermoid Co., Trenton, N. J., died on January 3, after a short illness. For some time he was manager of the company's branch at San Francisco, Calif.

He was a member of the Comitas Club, Trenton.

His wife survives him.

Burial was in Greenwood Cemetery, Trenton.

Assistant Sales Manager

INTERNAL complications following an ulcerated stomach caused the death, on December 24, of Jarvis S. McCrea, assistant sales manager, Binney & Smith Co., 41 E. 42nd St., New York, N. Y., carbon black manufacturer, with which he had been associated since 1923. Mr. McCrea was born 52 years ago in Buffalo, N. Y., where he went to school.

At one time he was in the traffic department of the Lehigh Valley Railroad and during the World War was captain in the Aviation Corps.

Burial took place on December 27 in Woodlawn Cemetery.

Machinery Supplier

PHILIP J. McGRORY, 79, died December 27, following a lengthy illness. He was engaged in the manufacture of mill supplies and rubber machinery in Trenton, N. J., for more than a half century. Mr. McGrory was well known in Trenton business circles; was a member of the Trenton Chamber of Commerce; Trenton Council, Knights of Columbus; Holy Name Society of St. Mary's Cathedral; and Trenton Lodge of Elks.

He is survived by his wife, a daughter, and a brother.

Interment was in St. Mary's Cemetery, Trenton.

William B. Clowar

Rubber Foreman

AFTER a somewhat protracted illness William B. Clowar passed away on November 20, 1934, at his home in Trenton, N. J., where for many years he served as a rubber foreman. He was born at Bakers Basin, Princeton Township, N. J., and obtained his education in the local public schools in his native place.

For many years Mr. Clowar was highly held in Trenton rubber plants for his thoroughness as a workman and his ability to supervise the construction of high-class rubber products. He specialized chiefly in hose making and at various times held foremanships in several important mechanical rubber goods plants of Trenton: namely, Acme Rubber Co., Thermoid Rubber Co., and Whitehead Bros. Rubber Co.; also New York Rubber Co., Beacon, N. Y., and Kenyon Tire & Rubber Co., Brooklyn, N. Y.

He was a member of Beacon Lodge No. 76, F. & A. M.; Trenton Lodge No. 60, Knights of Pythias; and Mercer Castle Knights of Golden Eagle No. 23, Trenton.

He is survived by his wife and a son.

Veteran Employe

ON JANUARY 10, Harry A. Palmer, for 15 years lobby clerk at the Goodyear Tire & Rubber Co., Akron, O., died, the victim of an automobile accident. Mr. Palmer, who was 83, had a long and varied business career, including such associations as superintendent of the Akron Electrical Mfg. Co. and salesman for the India Tire & Rubber Co. He also was city council president, Akron, from 1906 to 1910.

He was born in England, but his parents came to this country when he was an infant. He attended school in Tallmadge.

The deceased was a charter member of the 50-Year Club and an active Odd Fellow.

Surviving are his wife, 2 sons, a daughter, a sister, and a brother.

Funeral services were held January 12. Interment was in Glendale Cemetery.

Company Head

INJURIES suffered in a holdup resulted in the death, on January 14, of William C. Martin, president of the Martin Rubber Co., 1515 Kingsbury St., Chicago, Ill., which closed down last August. Mr. Martin later had an office at 2143 Carroll Ave.

So mysterious were the circumstances of Mr. Martin's death that police are investigating and holding the body for further examination.

Retired Salesman

FREDERICK S. CUMMINGS, 55, retired salesman, of Lambertville, N. J., died January 17, after a short illness of heart trouble. Mr. Cummings was formerly Midwest representative of the Lambertville Rubber Co., Lambertville, N. J.

He was a trustee of the Lambertville M. E. Church; a lay delegate to the New Jersey Conference; and a member of the Masonic orders.

He is survived by his wife, a son, and 2 daughters.

Burial was at Lambertville.

Well-Known Inventor

THOMAS MIDGLEY, inventor of demountable rims and holder of more than 300 patents for the manufacture of automobile tires and rims, died Christmas morning at his winter home in Bradenton, Florida. Born in London, England, 74 years ago, Mr. Midgley came to this country and attended public school in Worcester, Mass.

Leaving Worcester in 1884, he then joined the Hartman Steel Co., Beaver Falls, Pa., where he remained 4 years. He operated a business of his own until 1896 when he moved to Columbus, O., and became associated with the Columbus Bicycle Co. Again forming his own company in 1899, he operated it in Columbus until 1905 when he was elected president of the Hartford Rubber Works and was associated with this company until 1914. The Midgley Tire Co., Lancaster, O., was formed in 1914, and Mr. Midgley guided the operation of the company until 1917, when he was called to become consulting engineer in charge of mechanical development of the Fisk Rubber Co., Chicopee Falls, Mass., a position he held until his retirement in 1928.

Mr. Midgley is survived by his wife, and his son, Thomas Midgley, Jr., who is vice president of The Ethyl Gasoline Corp. and a very famous chemist.

Both father and son were members of the S. A. E.

NEW JERSEY

MOST rubber manufacturers in New Jersey report that 1934 showed an improvement over 1933. Orders have increased for hard rubber products, shoes, heels, and druggists' sundries. Large quantities of hose have been placed in warehouses for the early spring trade. But the general outlook is not so good. The labor situation is vexing, and the state income and sales taxes proposed by the new governor will make it very hard for the rubber sales industry of New Jersey.

The Rubber Manufacturers' Association of New Jersey held its annual meeting and dinner at the Trenton Club, Trenton, December 18. After the dinner came entertainment. The following officers were reelected for the year: president, John A. Lambert, Acme Rubber Mfg. Co.; vice president, Lloyd R. Leaver, The Thermoid Co.; secretary, Charles E. Stokes, Jr., Home Rubber Co.; treasurer, Horace B. Tobin, Woven Steel Hose & Rubber Co.

The Thermoid Co. and its subsidiary, Woven Steel Hose & Rubber Co., both of Trenton, are operating with full forces in all departments. George S. Fabel, connected with Thermoid and president of another subsidiary, Southern Asbestos Co., Charlotte, N. C., recently purchased a large farm near Trenton.

The Pocono Co. is experiencing slightly increased business. Conditions are promising for the spring trade.

The Thiokol Corp., Yardville, has announced 2 new products: oilproof synthetic rubber and rubber cement.

The American Tile & Rubber Co., Trenton, claims it has been discriminated against by the Emergency Relief Administration in the awarding of a contract to The Goodyear Tire & Rubber Co., Akron, O., for flooring on the ERA project in Minneapolis, Minn. Representative D. Lane Powers, protesting to Harry L. Hopkins, relief administrator, asserts the Trenton firm was the lowest bidder. It is said that the Minneapolis branch of the ERA gave the contract to Goodyear, second lowest bidder. Mr. Powers said the reason purported to have been given was that the Trenton firm could not match the colors of floors already laid by Goodyear. He added that despite assurances by American Tile that it had and could match these colors, the contract was awarded to Goodyear.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., recently completed arrangements to purchase from the Commercial Solvents Corp., 230 Park Ave., New York, N. Y., its 30% interest in the Krebs Pigment & Color Corp., 256 Vanderpool St., Newark, N. J., to give du Pont 100% stock ownership in the Krebs concern. The reported price of the purchase is $7,420,000. Krebs has plants also at Baltimore, Md., and Newport, Del.

Jos. Stokes Rubber Co., Trenton, reports that business at its local and Canadian plants shows a downward trend, but that conditions are seasonable. Milton H. Martindell, vice president and secretary-treasurer, was a member of the recent Mercer County Grand Jury at Trenton. William J. B. Stokes, president of the company, was reappointed a member of the Trenton Sinking Fund Commission, on which he has served since its inception over 16 years ago.

George R. Cook, 3d, a director of the Hamilton Rubber Co. and Acme Rubber Mfg. Co., both of Trenton, has been advanced from assistant treasurer to vice president of the Princeton (N. J.) Bank & Trust Co. Mr. Cook is a graduate of Princeton University.

Acme Rubber Mfg. Co., Trenton, finds business gradually improving, with prospects for the early spring very encouraging.

Murray Rubber Co., Trenton, continues to operate normally, with business better than during last year.

Mercer Rubber Co., Hamilton Square, reports that business has increased a little during the past few months.

Lawrence M. Oakley, an official of the Essex Rubber Co., Trenton, was on a business trip to New England.

Pierce-Roberts Rubber Co., Trenton, has announced that sales during 1934 were 20% better than in 1933. The company is using 2 shifts.

Whitehead Bros. Rubber Co., Trenton, is running normally in both the mechanical goods department and the shoe plant. Footwear orders have increased.

Luzerne Rubber Co., Trenton, announces that hard rubber production has increased over last year.

Innis, Speiden & Co., 117 Liberty St., New York, N. Y., manufacturer and importer of industrial chemicals, recently bought a modern 4-story building at Henderson and Eighth Sts., Jersey City, N. J., to be used for manufacturing and storage and as one of the convenient distributing points for Eastern trade.

Harry L. Fisher, of the development department of United States Rubber Products, Inc., Passaic, N. J., gave an illustrated lecture on "The Chemistry of the Rubber Gutta-Percha and Balata Hydrocarbons" before the Rhode Island Section, American Chemical Society, at Providence, R. I., January 10.

New York Belting & Packing Co., Passaic, during the week of January 7 held a meeting of its district sales managers, under the direction of General Manager B. F. Ruether. Other speakers included General Factory Manager W. H. Cobb, Ralph N. Hanes, in charge of sales promotion, and other members of the advertising department. Concluding the conference, a dinner was given.

Rubber Industry in Europe

GREAT BRITAIN

Beharrell Reelected I. R. I. President

At the general annual meeting of the Institution of the Rubber Industry in London on November 30, 1934, Sir George Beharrell was reelected president for the third consecutive year. In his response Sir George stated he would have retired this year, but application was being made to the Privy Council for a Royal Charter of Incorporation, and he wished to see the matter through, and for this reason alone he consented to occupy the chair a little longer. If the Institution gets a Royal Charter of Incorporation, such recognition would considerably enhance the reputation of the Institution and enlarge its activities. It would mean that the Institution ranked with the other learned societies, and its diplomas would be coveted as of great value everywhere.

Despite improved trade, Sir George continued, the country was still suffering from excess productive capacity; at the same time the spirit of nationalism in other countries which stimulated the erection of new factories in those countries tended to draw more and more production away from factories already not working to capacity. There seemed to be no cure for this condition except a greater feeling of trust between nations and a return to the old tradition of relying upon one another.

After his speech the president presented the Colwyn Gold Medal to D. F. Twiss, of the Dunlop Rubber Co., and praised the work of Dr. Twiss, who, he said, was the pioneer of that rationalization which really made possible the extraordinary progress of rubber compounding and processing technique and whose work in connection with the development of the use of latex in rubber manufacture was outstanding.

Oil from Rubber

Rubber readily lends itself to hydrogenation, and by suitable adjustment of the temperature either motor spirit or lubricating oil can be produced, the Fuel Research Board says in its report for the year ended March, 1934.

Experiments were first conducted in the 2-liter discontinuous converters, and a molybdenum sulphide catalyst supported on alumina gel was used. At a reaction temperature of 450° C. a product was obtained in which the spirit, boiling below 200° C., amounted to 50% by weight of the original rubber. The spirit was stable, water-white, and practically free from unsaturated hydrocarbons and after distillation would be suitable for use as motor spirit.

At a temperature of 350° C. a product was obtained which on fractionation under reduced pressure gave a pale yellow viscous oil amounting to 13% by weight of the original rubber. After heating in air for 24 hours at 150° C., it lost 7% by weight, the ultimate product, after heating, being a clear oil, but darker than the original. Its density, aniline point, and stability to oxidation indicate its suitability for use as a lubricant; however the viscosity of the oil would have to be improved, the viscosity temperature gradient being much steeper than that of a good lubricating oil, but very similar to that of a poor lubricating oil from an aromatic paraffinous base petroleum. After the initial tests a method of continuous operation for the hydrogenation of the rubber was employed.

The results are interesting, but, as the report says, the manufacture of these products from rubber would not be economic unless rubber was available at a very low price.

Progress in Rubber Roads

For the first time a rubber and asphalt road is to be tested in England. The Limmer & Trinidad Lake Asphalt Co., Ltd., has been cooperating with the London Advisory Council for Rubber Research of the Rubber Growers' Association, in experiments to incorporate rubber with the matrix for cold asphalt. Now 200 yards of one of the main roads at Poole are to be laid with the new material, at no cost to the Borough. If the road should not prove satisfactory, it is to be replaced with an approved material, again free of cost.

In the latest road crossings laid in England 6 black standard-size Gaisman road blocks are arranged to form a rectangle of 18 by 13½ inches and alternate with 6 white blocks similarly laid. The whole is finished with a border consisting of an inner line of black blocks and an outer line of white ones.

A composite road will be laid at Birmingham for the 1935 British Industries Fair. This road will be laid in sections of tarmacadam, concrete, rubber, wood, sett, brick, and iron, and should offer an excellent opportunity for studying the relative merits of the different types of modern road construction.

Old historical buildings in Oxford are being endangered by the vibration due to heavy traffic; consequently it has been suggested by Sir Michael Sadler, in the quarterly review of the Oxford Society, that the main streets in Oxford should be paved with rubber. If a start were made at Oxford, probably other old towns with buildings which it is desired to preserve for their architectural merit or historical associations will wish to follow suit.

British Notes

Asbestos fire blankets are valuable aids in quickly smothering outbreaks of fire. The Glasgow Asbestos Co. has just introduced a blanket and special open-bottomed container. The bottom of the container is fitted with a molded rubber retaining ring which prevents the blanket from falling out when not required, but at the same time quickly releases the blanket when, in case of fire, a loop attached at the end of the blanket and protruding from the container is pulled. This blanket, it appears, is already in use in moving picture theaters.

The British Tire & Rubber Co., (formerly British Goodrich Rubber Co.,) reports a satisfactory business year. Net profits for the year ended September 30, 1934, were £126,714 against £119,165 the year before, and total dividends of 8% (against 6% the preceding year) were turned out. The firm has not yet received any revenue from its holdings in the India Rubber, Gutta Percha & Telegraph Works Co., or from the British Woven Hose Co., but the situation for both concerns has so far improved that it is expected that before long their shares will prove valuable assets. The former of these 2 companies had net profits of £26,053 against a loss of £46,226 the year before and was able to pay the dividend on its preferred shares. The British Woven Hose Co. earned last year a profit of £12,901 against £7,501 the year before and has been able to work off its debit balance. This company owns a very extensive factory which has never been fully occupied, and the British Tire & Rubber Co. intends to open up a new department here early this year to utilize some of the hitherto idle space.

Germany

The regulation of the German rubber industry proceeds apace. The Rubber Control Bureau now notifies manufacturers monthly of the amounts of rubber they may work up in each

month, the quantity being based on the average monthly consumption of a firm for the period July, 1933, to June, 1934. It is forbidden to use more rubber in a month than is covered by the permit for that month, even if the extra rubber could be taken from stock on hand; permits are not transferable. Finally, offenses against the above rulings are punishable.

On the other hand, with a view to stimulating the export business, manufacturers who can show their exports have risen over a given period will be allotted special additional amounts of rubber which may also be used in manufactures for home consumption, but the allotments of those with declining exports will be correspondingly reduced.

Regulations have already been issued regarding the business in old and waste rubber; now the reclaim processes are to be controlled. Since the government insists on the production of high grade reclaims, plasticizers, and other preparations from waste rubber and also desires the recovery as far as possible of the fabrics in the old rubber, processes will be judged by the type of product they yield and not by their duration. Under no circumstances, therefore, may temperatures for reclaiming exceed 179° C., and no processes will be tolerated in which the waste or old rubber is heated directly without expansive steam or solvents. The alkali process after Marks is recommended as still yielding the best reclaim, but as we see above, the temperature may not be over 179° C., or the pressure over 145 pounds.

In many cases manufacturers have adopted, instead of the alkali processes, others in which superheated steam of any tension and up to a temperature of 250° has been employed. These are no longer permitted. Manufacturers may still devulcanize their waste rubber by superheated steam, but the temperature is not to be over 179° C. with pressure of at least 73 pounds. In solvent reclaim processes, where the aim is to recover the fabric too, the temperature of dissolution must be under 150° to insure preservation of the fabric.

Tire manufacturers have decided to raise the price of tires supplied to automobile manufacturers by 25%. Gross list prices are unaffected so that individuals owning cars will not have to pay more for the tires they buy—for the present at least.

Under the present regime there has been a considerable increase in the use of electricity for various purposes in both agricultural and industrial fields; so cable manufacturers have accordingly benefited. Last year, it is reported, home sales of cables and wires rose 60 to 80% with the gratifying result that the employment situation in the cable industry has also shown improvement.

On December 31, 1934, the well-known rubber machinery firm of Hermann Berstorff, Maschinenbau-Anstalt in Hannover, founded in 1897, commemorated 2 events: the conversion 25 years ago of the business into a limited liability company and the appointment at the same date of Hermann Meyer as managing director.

Italy's Rubber Trade

Although statistics show a considerable loss in Italy's rubber export business, the rubber industry is still the most active in the country because the increased home consumption more than makes up for any loss in foreign trade. During the first 6 months of 1934 the value of exports was 36,150,000 lire against 54,940,000 lire in the corresponding period of 1933; the value of imports, however, rose to 43,950,000 lire from 34,210,000 lire. Crude rubber imports alone advanced from 111,732 quintals to 125,866 quintals.

The foreign trade in the most important items, however, pneumatic tires and tubes, showed an all round shrinkage. Imports were only 7,168 quintals against 12,773 quintals; while exports fell from 37,706 to 24,733 quintals. It is worth noting that whereas Great Britain, hitherto the chief supplier of foreign tires to Italy, lost considerable ground during the period under review, the United States was able to show gains here. Regarding other imports, rubber belting showed the most important increase, from 500 to 797 quintals; rubber thread also advanced, from 321 to 429 quintals. Imports of rubberized apparel and elastic fabrics have not usually been very considerable, but for 1934 they show a comparatively substantial increase.

But the export business in similar lines dropped heavily: rubberized fabrics, from 2,428 to 903 quintals; thread, from 838 to 539 quintals; elastic fabrics, from 465 to 414 quintals; and other rubber goods, from 696 to 646 quintals. The only exports showing advances were rubber carpets, from 166 to 262 quintals, and rubber gloves, from 412 to 1,192 kilos.

Resinit

The Russian Trust for the Manufacture of Organic Substances has also been working on the problem of oil resistant rubber compounds. According to *Kautschuk*, this organization has succeeded in producing a preparation which, compounded with rubber, imparts a high degree of resistance to oil. The basic ingredients employed to produce Resinit, as the new preparation is called, are chlorine, sulphur, and sodium sulphide. After testing for 75 hours, the new material showed only a slight tendency to swell. Resinit compounds are said to have the same dielectrical and mechanical properties as the usual rubber compounds. It has also been brought out that in working with Resinit a saving of 15 to 30% in rubber is possible.

Polish Rubber Strike

After a compromise settlement of a labor dispute 1,700 workmen resumed work at the Pepege Rubber Mfg. Co., Grudziadz, Poland. The factory normally works 6 days a week, and monthly production is valued at almost 1,000,000 zlotys. Chief articles produced are rubber footwear, tires, and hose. Negotiations with creditors are under way and an agreement is expected soon. The first claim is a debt for overdue taxes. Production for the winter season is considerable, and it is reported that production is sold 2 months ahead. This company exports footwear particularly to Holland, Belgium, Denmark, Rumania, Yugoslavia, and Persia.

New England

(*Continued from page 52*)

American Wringer Co., Woonsocket, R. I., through G. R. Keltie, president and general manager, has announced the purchase of the controlling interest in the Chamberlain Corp., Waterloo, Iowa, manufacturer of Washington machine wringers, of which company Mr. Keltie was newly elected president.

William F. Alden Co., Inc., Needham, Mass., manufacturer of rubber floor coverings and other products, recently bought Mill No. 1 of the former Bigelow Sanford Mills in Clinton, Mass. About 60 workers will be employed when the mill is in full operation.

C. C. Davis, assistant technical director, Boston Woven Hose & Rubber Co., Boston, Mass., and editor of *Rubber Chemistry and Technology,* recently returned from a vacation trip in Italy. His monograph on rubber soon will be published by the American Chemical Society.

Cyrus S. Ching, director of industrial and public relations, United States Rubber Co., 1790 Broadway, New York, N. Y., was listed as the principal speaker at the sixteenth annual dinner of the Rhode Island Textile Association held at the Providence-Biltmore Hotel, Providence, R. I., January 31.

Archer Rubber Co., Milford, Mass., according to George Sullivan, of the clothing department, recently purchased the good will and manufacturing equipment of the Clifton Mfg. Co., Jamaica Plain, Boston, Mass. Archer's manufacturing facilities at Milford are being enlarged to take care of this extra equipment and manufacturing resulting from the new acquisition.

Rhode Island Rubber Club on January 9 held its second meeting at the Narragansett Hotel, Providence, R. I. President Ernest G. Brown presided at the gathering which attracted nearly 100 members and guests, including representatives of the industry from Boston and New York. Dr. Ernst A. Hauser of Vienna, Austria, the guest speaker, discussed the use of latex in casting rubber goods.

Rubber Industry in Far East

MALAYA

Restriction Complaints

As in the time of the Stevenson Scheme, it has not taken long for protestations to begin pouring in regarding the unfairness of assessments. Many estates, it is claimed, have been granted export allowances which they cannot possibly produce. Managers are being urged to do their utmost to fill quotas, and on several estates the order is to tap to capacity; while instances are quoted where tapping is done twice a day in more or less futile efforts to obtain the allotted amounts of rubber. On the other hand, proprietary planters complain that their allowances are considerably below their productive capacity and that rubber that has been rested for more or less prolonged periods during the slump is assessed at a maximum of 500 pounds per acre although they can produce much more; while at the same time estates which tapped all-out during the entire slump period are granted quotas based on these forced yields which are now impossible to reproduce. To sum up, the conviction seems fairly widespread that along with a certain amount of under-assessment is a very great deal of over-assessment, and the export figures last year are quoted to prove the latter contention.

Any restriction scheme is bound to have a certain amount of unintended unfairness, particularly at the outset, and no doubt some of the conditions complained of do exist, but it should not be long before they are remedied, at least to some extent.

Whether the low export figures last year were due to inability of estates to produce their quotas or merely to unsettled labor conditions, abnormally wet weather, or to hoarding should become evident during 1935. It will probably be found that a combination of factors was responsible for this state of affairs. As has been pointed out before in these columns, of all the producing countries (except Indo-China) Malaya was the only one whose outputs did not show any considerable reduction during the period of unprecedented low prices before restriction. While many estates closed down wholly or in part, many more tapped to capacity to minimize their losses; and no doubt these estates, or at least part of them, now have difficulty in continuing at the same rate.

The official opinion seems to be that the trouble lies in large-scale hoarding of stocks by dealers and estates, and a curb has been sought in an amendment to the Rubber Regulation Bill, which provides that unused credits and coupons will be canceled at the end of each quarter instead of at the end of each year. The new rule should also help to correct over-assessment if it is actually as widespread as some claim. For since estates are allowed to have 2 months' production in stock, those that consistently fall behind in their quotas would become conspicuous, and measures would have to be taken to revise their assessments.

Effects of Restriction

Examination of the reports of a number of rubber companies shows that restriction and the resulting higher prices is bringing many companies back to the dividend paying stage. So far the dividends are for the most part not very important, but compared with the losses reported the year before, they look very well indeed.

As was to have been foreseen, however, with returning prosperity has also come increased costs. The great demand for labor has sent wages up 20% and more; with more cash in hand, estates can no longer afford to neglect upkeep; on several estates cuts to the European staff are being restored; also the concession regarding quit rents has been withdrawn. All these factors affect the final all-in cost so that it now lies a good deal higher than before, at least on most estates.

Uniformity and Cleanliness of Latex

The questions of uniformity and cleanliness of latex were carefully discussed by Edgar Rhodes, of the Chemical Division of the Rubber Research Institute of Malaya, in his lecture on "Recent Investigations on Latex," given at a recent conference. The world demand for latex has been increasing for several years, and the increase is likely to continue, the speaker said, so that the time was not far off when estates would have to adopt a latex policy to be in a position to meet with consumers' specifications, which are many and wonderful, but would for the most part be met if the 2 factors, uniformity and cleanliness, are given due consideration.

Uniformity is influenced by a number of factors, controllable and otherwise, as tapping systems, climate, soil, elevation, seasonal variation, strain of seed or budwood, changes in tapping-height. After the controllable factors are successfully handled, much study and care would still be necessary to make the proper adjustments with regard to the uncontrollable factors.

Mr. Rhodes next discussed the importance of absolute cleanliness for securing a good white latex. The most frequent complaint of consumers about Malayan latex was that it was of a blue-grey color instead of white and that it contained a dark-colored sediment; while the stability of such latex also was unsatisfactory. After much investigation it was found that the root cause of the discoloration was the putrefaction of latex in the presence of iron, producing hydrogen sulphide; putrefaction of latex also produced lactic acid, which attacked iron at a great rate and brought it into solution as the lactate. Thus putrefaction produced both the essential ingredients for discoloration, and as soon as ammonia was added as a preservative, the dark-colored iron sulphide was formed.

To prevent this condition absolute cleanliness of cups, pails, and other utensils used must be insisted on first of all, and then ammonia must be added to the latex in the field to keep it alkaline while being transported as quickly as possible to the factory.

Mr. Rhodes then considered the results of some recent work by Mr. Hastings on a method of coagulating unsalable old, ammoniated latex. After much experimentation various combinations of magnesium chloride and magnesium sulphate with sodium silicofluoride have been found with which a smooth coagulation is possible, and good sheet has been produced from old preserved latex, centrifugal skim latex, and creamed latex.

The new coagulant works quickly; coagulation occurs in a few hours, and putrefaction never takes place. It gives such a plastic coagulum that ammoniated latex can be coagulated overnight at a dry rubber content of 3½ pounds per gallon and still give a coagulum which rolls out with ease to a thickness of 1/10-inch.

Experiments are not yet completed, but it is hoped that the coagulant will become useful for special purposes not only for experimental work on modified rubbers at the Institute, but also on estates which have special coagulation problems.

Rubber Chute Linings

In 1933 the Propaganda Committee of the Rubber Growers' Association had arranged experiments with various types of rubber linings for chutes for conveying coal. These linings, of which 2 had a high crude rubber con-

tent while the third was highly compounded, were tried out at important docks in South Wales. Before long it developed that the rubber linings were not so durable as steel, an unlooked-for result in view of the known resistance of properly compounded rubber.

After this failure rubber chute lining was installed with a baffling arrangement built in to replace articulated tubular chutes handling anthracite. The lining has been in use for some time now, and a letter from the general manager of the docks states that it is extraordinarily efficient and shows a very marked improvement on any previous anti-breakage appliance used at the docks.

Packing Rubber in Paper Sacks

Smoked sheets packed in paper sacks[1] received in London in experimental shipment from Malaya reveal advantages that will likely result in important changes in the standard packing of rubber.

Bales, 100 pounds each, of standard cross-section, but half the usual height, are covered with wrapper sheets applied longitudinally. The exterior is then dusted with a mixture of one part zinc stearate and 2 parts magnesium oxide; then 2 very strong 4-ply paper sacks, shaped the same as the bale section and a few inches more than half its length, are fitted over either end of the bale so that the tops overlap. These are secured with a latex adhesive to form a neat, strong moisture- and dust-proof bale covering that does not of itself impart splinters or fibers to the enclosed rubber.

The folded ends of each bag are sewed with chain stitching, the underthread of which can be pulled to release the seam. The rubber is accessible for sampling without cutting or tearing the covering. Reclosing can be accomplished by fastening the original folds with heavy gum tape.

[1] "Packing Experiments," A. Moore, *J. Rubber Research Inst. Malaya*, Dec., 1934, pp. 373-78.

Netherland India

The second period of restricted imports for Netherland India covered the months October-November, 1934, the first having run from June 1 to September 30, 1934, in all 6 months. In a recent issue of the *Indische Mercuur*, W. Spoon gives the following table to show the comparative working of restriction during the 2 periods as well as for the entire 6 months.

EXPORTS OF DRY RUBBER FROM NETHERLAND INDIA UNDER RESTRICTION, METRIC TONS, NET

	Estate	Native	Total
First Period, June-September, 1934			
Exported	45,252	61,123	106,375
Allotted	66,035	47,183	113,218
Difference ..	—20,783	+13,940	—6,843
Second Period, October-November, 1934			
Exported			
October	12,480	5,434	17,914
November	15,591	4,523	20,114
Total	28,071	9,957	38,028
Allotted	27,804	19,880	47,684
Difference ..	+267	—9,923	—9,656
Entire Period, June-November, 1934			
Exported	73,323	71,080	144,403
Allotted	93,839	67,063	160,902
Difference ..	—20,516	+4,017	—16,499

From the table it is seen that in the first period estates were so far behind their quotas, having shipped not much more than ⅔ of their allowance, that total Netherland India exports for the period fell short of the quota by 6,843 tons despite the fact that native exports had exceeded their quotas by almost 30%.

In the next period the position was reversed. Estates went slightly above their allowance; while the natives shipped about half their allotted amount. At the end of the 6 months, however, natives were still a little ahead, but estates still so far behind that total exports for the 6 months were 16,499 tons short of the quota for the period.

Mr. Spoon points out that estates evidently had a hard time meeting their quotas when the allowance was 95%, but had no difficulty in filling them when they were 80%, permitting the inference that the 95% allowance had been too high for the estates. Still, analysis of the estate figures shows that while the monthly exports over the first period only averaged somewhat over 11,000 tons, the monthly average over the second period was 14,000 tons. It is therefore permissible to deduce that necessary adjustments during the first period may largely have been responsible for the deficit, and now that these have been made, estates are getting into their stride again.

The very drastic effect that the special export duty had on native rubber shipments is clear; from a monthly average of over 15,000 tons in the first period, they were reduced in the next period to less than 5,000 tons, a reduction of around 67%! That this cut was rather more than the government bargained for is evident from the fact that the export duty was reduced as of December 16, 1934.

From another source we learn that native exports fell most sharply in Palembang and Djambi. In the former district it appears that the drop in price combined with the high export duty led to a considerable cessation of tapping. But in Djambi large amounts of rubber had been bought by Chinese when rubber started to fall in October and were held against a possible rise. But since prices continued to fall, the Chinese were left with large stocks on their hands. The resident of Djambi called together all rubber dealers late in November and advised them not to buy any more rubber and to sell as much of their stocks as possible. This advice was doubtless given in preparation of the new rules to curb hoarding that were subsequently issued. It now remains to be seen what effect the new measures will have on native shipments.

For 1935 Netherland India's basic quota is 406,400 tons; for the first quarter of this year restriction has been fixed at 25% so that the Dutch allowance for the quarter works out at 76,200 tons, or 25,400 tons a month. On the basis of the October-November figures it may be assumed that estates will fill their quota; but the problem again is—how will the native react?

INTERESTING LETTERS

Prosperity Ahead for Malaya

TO THE EDITOR: I enclose copy of my editorial article appearing in *The Times of Malaya*, December 10, 1934, as I feel sure that it will interest you.

After a quarter of a century's experience in this country I am convinced that there is very decided deterioration in aged trees all over the Mid-East and all the more so, as a vulgar planter friend has put it, because an "unnatural offence" is done to the rubber tree by tapping it.

I support reasonable rubber production control because bankruptcy of the industry would mean a great rubber famine in a very short time, but I stand against any price "ramp," as do the majority of the people in this country.

To my mind it is a matter for the deepest regret that there is not the closest liaison between the U.S.A. rubber consumer and the British producer, and I have repeatedly urged the local Government to station a liaison officer in New York to keep us in touch with what our best customers for rubber exactly want.

As Governments, and particularly British Governments (I am a Briton), are always entangled in "red tape" the heads of some of your big rubber factories should visit this country periodically to create a liaison.

If there is any information from this country you require I shall be pleased to supply it free of charge. I think that I am an unbiased person as I have no rubber investments, being content with the ownership of *The Times of Malaya*.

J. A. S. JENNINGS, EDITOR,
The Times of Malaya.

Ipoh, Perak,
Federated Malay States,
December 10, 1934.

The editorial mentioned above recorded the passing of Malaya's business slump and stressed that country's assured further prosperity in possessing 2 commodities, rubber and tin, which the world must have and which Malaya can produce much cheaper than any competitor. THE EDITOR.

Patents and Trade Marks

MACHINERY

United States

19,393 (Reissue). **Inflatable Ball Apparatus.** B. Kozmer, Chicago, Ill.

1,981,893. **Tire Bead.** A. O. Abbott, Jr., Grosse Pointe Park, assignor to Morgan & Wright, Detroit, Mich.

1,981,956. **Latex Applying Top Cementing Machine.** B. Jorgensen, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,982,026. **Material Hardness Measurer.** A. F. Shore, New York, N. Y.

1,982,507. **Rubber Thread Warper.** J. E. Fite, Philadelphia, Pa.

1,982,576. **Molding Press.** J. Derry, Medford, assignor to A. Terkelsen, Newton, both in Mass.

1,982,673. **Inflatable Tire Curing Bag.** L. A Laursen, Akron, O.

1,982,674. **Tire Casing Sealing Ring.** L. A. Laursen, Akron, O.

1,982,860. **Pneumatic Tire Casing Apparatus.** C. H. Desautels, Springfield, Mass., assignor, by mesne assignments, to Fisk Rubber Corp., a corporation of Del.

1,982,933. **Winder.** C. R. Sibley, Lake Mary, Fla., assignor, by direct and mesne assignments, to Sibley-Pym Corp., Lynn, Mass.

1,983,129. **Cloth Cutter.** J. B. Gury, Jr., assignor to J. B. Gury Mfg. Co., both of St. Louis, Mo.

1,983,413. **Textile Filamentary Material Twister.** S. Spagnolo, assignor to Societa Italiana Pirelli, Milan, Italy.

1,983,684. **Tire Painter and Trimmer.** W. J. Strong, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,983,705. **Tire and Tube Repair Unit.** E. J. Pilblad, Nassau County, N. Y., and E. Fetter, Baltimore, Md., assignors, by mesne assignments, to Gabriel Pneumatic Vulcanizer, Inc., a corporation of O.

1,983,837. **Hose Cutter.** L. P. Berwick, Methuen, Mass.

1,983,967. **Rubber from Latex Preparing Apparatus.** M. A. Cheek, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,983,976. **Vented Mold.** B. S. Garvey, Jr., Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,984,166. **Gummed Tissue Apparatus.** H. Walter, Berlin-Charlottenburg, assignor to Siemens & Halske A. G., Siemensstadt, both in Germany.

1,984,507. **Variable Speed Drive.** H. E. Waner, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,984,730. **Rubber Ring Cutter.** G. F. Darling, assignor to Crown Cork & Seal Co., Inc., both of Baltimore, Md.

1,984,768. **Vulcanizer.** F. J. Shook, assignor to National Rubber Machinery Co., both of Akron, O.

1,984,818. **Tire Vulcanizer.** J. R. Stricklen and S. A. Fraine, both of Akron, O., assignors to Taylor Instrument Cos., Rochester, N. Y.

1,984,904. **Impact Tester.** N. Warshaw, Boston, and H. B. Shepard, Newton, assignors to Stowe-Woodward, Inc., Newton Upper Falls, all in Mass.

1,984,909. **Retreading Mold Inner Heating Device.** W. R. J. Woock, assignor to Super Mold Corp., both of Lodi, Calif.

Dominion of Canada

346,379. **Tube Cutter.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., assignee of F. C. Matthews, F. E. Brown, and J. W. H. Pengelly, coinventors, all of London, England.

346,520. **Vulcanizing Apparatus.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of R. W. Brown and G. P. Bosomworth, coinventors, both of Akron, O., U. S. A.

346,617. **Tire Grooving Tool.** C. F. Ruggles, Toronto, Ont.

346,627. **Footwear Repairer.** J. O. Yunker, Wauwatosa, Wis., U. S. A.

346,655. **Jar Cap Gasket Machine.** Crown Cork & Seal Co., Inc., Baltimore, Md., assignee of M. G. Parks, Dayton, O., both in the U. S. A.

346,734. **Tape Applier.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of G. Hazelton, Leicester, England.

United Kingdom

414,908. **Heel Mold Washer Feeder.** Trenton Patents, Ltd., London. (W. H. Patten and A. M. Scholz, both of Trenton, N. J., U. S. A.)

415,341. **Electrode.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

415,650. **Pile Fabric Folder.** R. F. McKay, Birmingham. (International Latex Processes, Ltd., St. Peter's Port, Channel Islands.)

415,759. **Sole Cutter.** British United Shoe Machinery Co., Ltd., Leicester. (United Shoe Machinery Corp., Boston, Mass., U. S. A.)

416,144. **Rubber Thread Apparatus.** R. F. McKay, Birmingham. (International Latex Processes, Ltd., St. Peter's Port, Channel Islands.)

416,185. **Tube Vulcanizer.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

416,268. **Tire Vulcanizer.** P. Roussillon, Seine-et-Oise, France.

416,812. **Vulcanizing Apparatus.** W. T. Henley's Telegraph Works Co., Ltd., London, W. C. Barry, Gravesend, and H. C. Hoban, Dartford.

Germany

606,312. **Machine to Make Heel Stubs and Treads.** Industrie-und Handelsgesellschaft m.b.H., Vaduz, Liechtenstein. Represented by E. Bogdahn, Berlin.

606,797. **Comb-Cutting Machine.** C. Tober, Berlin-Karlshorst.

607,194. **Vacuum Drying Cabinet.** Gesellschaft fur Chemische Industrie in Basel, Basel, Switzerland.

607,259. **Electrically Heated Vulcanizing Mold.** O. Stickler, Hannover.

PROCESS

United States

1,981,909. **Perforated Corset Material.** R. J. Dunn and H. D. McLean, both of Fairfield, Conn., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,982,024. **Fibrous Material Treatment.** R. P. Rose, Jackson Heights, and A. F. Owen, Saratoga Springs, assignors to General Rubber Co., New York, all in N. Y.

1,982,218. **Golf Ball.** P. A. Martin, Birmingham, England.

1,982,288. **Insulated Wire.** R. R. Evans, Watertown, assignor to Simplex Wire & Cable Co., Boston, both in Mass.

1,982,385. **Composite Porous and Microporous Article.** E. A. Hauser, Wimpassing I. Schwte, Austria, assignor to Kaysam Syndicate, Ltd., London, England.

1,982,712. **Laminated Glass.** G. B. Watkins, assignor to Libbey-Owens-Ford Glass Co., both of Toledo, O.

1,982,869. **Flexible Belt.** D. Heyer, assignor to United States Electrical Mfg. Co., both of Los Angeles, Calif.

1,983,352. **Printer's Blanket.** T. T. Ellis, assignor to New England Fibre Blanket Co., both of Worcester, Mass.

1,983,464. **Brake Lining.** W. G. Kitchen, assignor to Allbestos Corp., both of Philadelphia, Pa.

1,983,667. **Molded Rubber Article.** L. H. L'Hollier, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

1,983,677. **Sponge Rubber Article.** R. E. Riley, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,983,695. **Decorating Sheet Rubber.** F. Fenton, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,983,764. **Coating Wires, Threads, and Filaments.** F. H. Lane, E. W. Madge, and E. A. Murphy, all of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

1,983,963. **Crinkled Rubber Glove.** P. L. and O. L. Belton, both of Barberton, assignors to Seiberling Latex Products Co., Akron, all in O.

1,984,928. **Forming Rubber Bags.** P. H. Henkel, assignor to Continental Rubber Works, both of Erie, Pa.

1,985,002. **Rubber Article.** D. F. Twiss and E. A. Murphy, both of Wylde Green, and A. Niven, Erdington, assignors to Dunlop Rubber Co., Ltd., London, all in England.

1,985,045. **Porous or Microporous Article.** E. W. Madge, Erdington, and A. N. Ward, Bordesley Green, assignors to Dunlop Rubber Co., Ltd., Birmingham, all in England.

1,985,203. **Antislip Product.** A. W. Charbonneau, Roslindale, Mass.

Dominion of Canada

346,656. **Jar Cap Gasket.** Crown Cork & Seal Co., Inc., Baltimore, Md., assignee of M. G. Parks, Dayton, O., both in the U. S. A.

346,686. **Article Surfacing.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. A. Murphy, Birmingham, England.

United Kingdom

415,942. **Rubber Goods and Coatings.** Metallges. A. G. and H. Miedel, both of Frankfurt a. M., Germany.
416,048. **Tire Cover.** J. E. C. Bongrand, Paris, and L. S. M. Lejeune, Wasquehal, both in France.
416,077. **Rubber Sheets.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and E. W. Madge and F. J. Payne, both of Birmingham.
416,154. **Coloring Balls.** Dunlop Rubber Co., Ltd., London, and D. F. Twiss, F. A. Jones, and D. J. Hadley, all of Birmingham.
416,499. **Sponge Rubber Article.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and D. F. Twiss and W. McCowan, both of Birmingham.
416,621. **Preserving Fruit.** H. Rollmann, Marienburg, Cologne, Germany.
416,756. **Covering Tennis Balls.** J. E. Pollak, London. (Continental Gummi-Werke A. G., Hannover, Germany.)

Germany

605,706. **Rubber Cover for Faucet Attachments.** Rheinische Gummi-Gesellschaft W. Klotz & Co., Dusseldorf.
605,762. **Belting of Latex-impregnated Fabric.** James Dawson & Son, Ltd., Lincoln, England. Represented by R. David, Berlin.
605,763. **Beveled Sections for Gas-filled Hollow Goods.** Deutsche Dunlop Gummi-Compagnie, A.G., Hanau a.M.
605,785. **Latex - impregnated Fiber Goods.** J. D. Serra, Barcelona, Spain. Represented by G. Breitung, Berlin.
605,967. **Thread, Sheets, or Tubes.** Revere Rubber Co., Providence, R. I., U. S. A. Represented by C. Wiegand, Berlin.
606,044. **Rubber-covered Goods.** I. G. Farbenindustrie A.G., Frankfurt a.M.
606,848. **Rubberizing Hose.** Thuringer Schlauchweberei und Gummiwerk A.G., Waltershausen i. Thur.

CHEMICAL

United States

1,982,018. **Rubber Coated Paper.** A. F. Owen, Glenbrook, assignor to Naugatuck Chemical Co., Naugatuck, both in Conn.
1,982,231. **Artificial Leather.** A. N. Parrett, Milwaukee, Wis., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.
1,983,367. **Insulation Material.** R. H. Harrington, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.
1,983,703. **Latex Treatment.** J. McGavack, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.
1,983,730, 1,983,731, and 1,983,732. **Factice.** R. Beyer, Brooklyn, assignor to Robert Beyer Corp., New York, N. Y.
1,983,949. **Synthetic Rubber.** W. L. Semon, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
1,983,972. **Rubber Manufacture.** M. Faldini, assignor to Societa Italiana Pirelli, both of Milan, Italy.
1,984,246. **Factice.** R. Beyer, Brooklyn, N. Y., assignor to Robert Beyer Corp., a corporation of N. Y.
1,984,247. **Abrasion Resisting Rubber.** S. M. Cadwell, Grosse Pointe Village, assignor to Morgan & Wright, Detroit, both in Mich.
1,984,922. **Composition.** W. C. Fischer, Chicago, Ill.

Dominion of Canada

346,356. **Adhesive Composition.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. L. Fisher, Leonia, N. J., U. S. A.
346,524. **Accelerator.** Goodyear Tire & Rubber Co., Akron, O., assignee of H. Adkins, Madison, Wis., and H. I. Cramer, Cuyahoga Falls, O., co-inventors, all in the U. S. A.
346,525. **Accelerator.** Goodyear Tire & Rubber Co., assignee of J. G. Lichty, both of Akron, O., U. S. A.
346,526. **Accelerator.** Goodyear Tire & Rubber Co., assignee of H. R. Thies, both of Akron, O., U. S. A.
346,559. **Coating Composition.** Wingfoot Corp., Wilmington, Del., assignee of H. A. Endres, Silver Lake, O., both in the U. S. A.
346,560. **Antioxidant.** Wingfoot Corp., Wilmington, Del., assignee of W. C. Calvert, Cuyahoga Falls, O., both in the U. S. A.
346,561. **Age Resister.** Wingfoot Corp., Wilmington, Del., assignee of W. M. Lauter, Cuyahoga Falls, O., both in the U. S. A.
346,642. **Latex Adhesive.** Boston Blacking Co. of Canada, Ltd., Montreal, P. Q., assignee of W. H. Wedger, Belmont, Mass., U. S. A.
346,670. **Accelerator.** I. G. Farbenindustrie A. G., Frankfurt a. M., assignee of W. Lommel, Leverkusen-Wiesdorf, and R. Schröter, Leverkusen-I. G. Werk, co-inventors, all in Germany.

United Kingdom

415,700. **Accelerator.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.
415,718. **Wetting Agent.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.
415,728. **Porous Mass.** F. J. Farrell, Gt. Yarmouth, and A. A. Lautenberg, Barnby.
415,789. **Rubber Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.
415,790. **Accelerator.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.
415,795. **Chlorinated Rubber.** S. B. Cormack, Widnes, and Imperial Chemical Industries, Ltd., London.
415,832. **Factice.** L. Laurin and E. Bidot, both of Dijon, Côte d'Or, France.
415,927. **Molding Composition.** Studien-Und Verwertungs-Ges., Mulheim-on-Ruhr, Germany.
415,954. **Rubber Composition.** Naugatuck Chemical Co., Naugatuck, Conn., assignee of S. D. Shinkle, Passaic, N. J., both in the U. S. A.
416,056. **Chlorinated Rubber.** J. P. Baxter, Widnes, and Imperial Chemical Industries, Ltd., London.
416,079. **Age Resister.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.
416,252. **Chlorinated Rubber.** Chemische Fabrik Buckau, Saalkreis, Germany.
416,340. **Accelerator.** Hanseatische Muhlenwerke A. G., Hamburg, Germany.
416,410. **Age Resister.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.
416,413. **Adhesive Product.** H. E. Potts, Liverpool. (Shawinigan Chemicals, Ltd., and Canadian Electro Products Co., Ltd., both of Montreal, Canada.)
416,591. **Porous Rubber Composition.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and H. J. Stern, both of London.
416,661. **Accelerator.** I. Kreidl, Vienna, Austria.
416,675. **Age Resister.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.
416,679. **Rubber Composition.** Dunlop Rubber Co., Ltd., London, and A. E. T. Neale, E. W. B. Owen, J. A. Wilson, and D. F. Twiss, all of Birmingham.
416,742. **Latex Rubber Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and D. F. Twiss and E. W. B. Owen, both of Birmingham.

Germany

605,812. **Microporous Goods.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. Wiegand, Berlin.
605,945. **Chlorinated Rubber Masses.** I. G. Farbenindustrie A.G., Frankfurt a.M.
606,243. **Mixes to Add to Plastic Masses, Especially Rubber Compounds.** Deutsche Hydrierwerke, A.G., Rodleben b. Rosslau, Anhalt.
606,339. **Vulcanizing Rubber.** Rubber Service Laboratories Co., Akron, O., U. S. A. Represented by F. Düring and H. Boeters, both of Berlin.

GENERAL

United States

19,380. (Reissue). **Undergarment.** A. D. Craig, assignor to Thomas Dalby, Inc., both of Watertown, Mass.
1,980,265. **Antiskid Device.** H. B. Gillette, assignor to Gillette Rubber Co., both of Eau Claire, Wis.
1,980,348. **Hot Water Bag Attachment.** I. L. Mitchell, Atascadero, Calif.
1,980,350. **Reservoir Pen.** H. Okada, Tokyo, Japan.
1,980,387. **Electric Cable.** W. A. Del Mar, Greenwich, Conn., assignor to Habirshaw Cable & Wire Corp., New York, N. Y.
1,980,408. **Golf Club.** C. G. Jansky, Berwyn, assignor to Wilson-Western Sporting Goods Co., Chicago, Ill.
1,980,437. **Power Transmission Device.** G. C. Reeves, assignor to Dryden Rubber Co., both of Chicago, Ill.
1,980,445. **Mattress.** M. Sherover, New York, N. Y.
1,980,466. **Hose Connection.** J. M. Angeja, Oakland, Calif.
1,980,486. **Surgical Foot Covering.** Le R. M. King and W. E. Tournat, both of Oakland, Calif.
1,980,517. **Seed Cleaner.** E. A. Good, Clarksville, Mich.
1,980,528. **Electric Heating Pad.** J. Hübl, Vienna, Austria, assignor to firm "Pelithe" Holding A. G., St. Gallen, Switzerland.

1,980,541. **Motor Mounting Hydraulic Control.** R. K. Lee, Highland Park, assignor to Chrysler Corp., Detroit, both in Mich.

1,980,580. **Centrifuge Spindle Guide Bearing.** V. J. Gilmore, Wappingers Falls, assignor to De Laval Separator Co., New York, both in N. Y.

1,980,583. **Nail Set.** J. R. Gurley, assignor to B. M. Gurley and himself, both of Akron, O.

1,980,655. **Hand Grip.** M. D. Balistreri, Pittsburgh, Pa.

1,980,663. **Wheel.** R. J. Burrows and A. O. Williams, assignors to Clark Tructractor Co., all of Battle Creek, Mich.

1,980,664. **Rail Car.** R. J. Burrows and A. O. Williams, assignors to Clark Tructractor Co., all of Battle Creek, Mich.

1,980,767. **Brassiere.** H. B. Snader, Reading, Pa.

1,980,803. **Massage Applicator.** D. M. Johnson, Detroit, Mich.

1,980,976. **Side Windshield.** J. P. Callahan, San Francisco, Calif.

1,981,136. **Girdle.** J. Bloom, New York, N. Y.

1,981,182. **Marine Fender.** C. T. Lyons, Medina, assignor to Durable Mat Co., Seattle, both in Wash.

1,981,249. **Detergent Unit.** S. Rosenblatt, Medford, assignor to Surgical Dressings, Inc., Jamaica Plain, both in Mass.

1,981,262. **Underreamer Plunger and Screen.** C. E. Burt, Los Angeles, assignor to Baker Oil Tools, Inc., Huntington Park, both in Calif.

1,981,267. **Dipper Door Protector.** G. B. Heffelfinger, assignor to Marion Steam Shovel Co., both of Marion, O.

1,981,283. **Door Bumper.** I. D. Perry, Chicago, assignor, by mesne assignments, to Atwood Vacuum Machine Co., Rockford, both in Ill.

1,981,293. **Target Range.** A. G. Varrelman, Vineland, N. J.

1,981,300. **Sole.** O. M. Berg, Emeryville, Calif.

1,981,320. **Bathing Suit.** C. L. Martin, assignor to Indera Mills Co., both of Winston-Salem, N. C.

1,981,355. **Sash Construction.** W. S. Hamm, Elkhart, Ind., assignor to Adlake Co., Chicago, Ill.

1,981,358. **Sink Stopper.** J. B. Hernandez, New York, N. Y.

1,981,527. **Display Form.** F. Schlag and A. Fuggiti, both of Chicago, Ill.

1,981,561. **Bandage.** W. D. Lloyd, assignor, by direct and mesne assignments, to National Super Products Corp., both of Chicago, Ill.

1,981,600. **Uninflammable Balloon.** J. Letourneur, Versailles, France.

1,981,666. **Bed Lift.** F. T. Ridley, London, assignor to F. W. Ridley, Birmingham, both in England.

1,981,698. **Artificial Hand.** F. C. Henning, Chicago, Ill.

1,981,720. **Football Bladder Valve.** M. Crane, assignor to Seamless Rubber Co., Inc., both of New Haven, Conn.

1,981,736. **Storage Battery Separator.** M. H. Martindell, assignor to Jos. Stokes Rubber Co., both of Trenton, N. J.

1,981,851. **Massaging and Shaving Brush.** M. H. Aten, Burlingame, Calif.

1,981,870. **Elastic Power Transmitter.** E. C. Magdeburger, Washington, D. C.

1,981,871. **Boat.** F. G. Manson, Dayton, O.

1,981,886. **Engine Mounting.** R. S. Trott, Denver, Colo.

1,981,959. **Practice Golf Ball.** W. Landreth, Los Angeles, assignor of 1/10 to M. L. Hartmann, Beverly Hills, both in Calif.

1,982,001. **Pessary.** E. C. Haas, Denver, Colo.

1,982,043. **Car Wheel.** N. R. Brownyer, assignor to Timken-Detroit Axle Co., both of Detroit, Mich.

1,982,095. **Storage Battery Separator.** G. N. Goodrich, St. Paul, Minn.

1,982,115. **Vehicle Spring Suspension.** A. F. Masury, assignor to International Motor Co., both of New York, N. Y.

1,982,135. **Pneumatic Tire.** P. Daddio, New York, N. Y.

1,982,138. **Furniture Cushion Slide.** W. F. Herold, assignor to Bassick Co., both of Bridgeport, Conn.

1,982,169. **Electric Connecter.** F. C. Kollath, Chicago, Ill., assignor, by mesne assignments, to Cutler-Hammer, Inc., Milwaukee, Wis.

1,982,182. **Dustpan.** F. E. Stover, assignor of ½ to H. Linkens, both of Grand Rapids, Mich.

1,982,208. **Elastic Thread.** J. R. Gammeter, Akron, O., assignor to United States Rubber Co., New York, N. Y.

1,982,225. **Lifting Device.** W. Miller, New York, N. Y.

1,982,345. **Window Washer.** J. B. Kirby, W. Richfield, O.

1,982,377. **Vehicle Wheel.** J. F. Duby, Boston, Mass.

1,982,430. **Flow Switch.** R. B. Hicks, Brooklyn, N. Y.

1,982,440. **Bottle Closure and Dropper.** S. H. Lebowitz, New York, N. Y.

1,982,452. **Milking Machine Teat Cup.** J. and A. Persoons, both of Thildonck, Belgium.

1,982,515. **Mat.** A. K. Hodes, Fremont, O.

1,982,516. **Seat Mat.** F. K. Holmested, assignor to F. K. Crocker, both of Charleston, W. Va.

1,982,533. **Tube Coupling.** A. L. Parker, Cleveland, O.

1,982,579. **Sleeping Garment.** G. F. Earnshaw, assignor to Earnshaw Knitting Co., both of Newton, Mass.

1,982,589. **Manicurists' Finger Support.** K. H. Bergstrom, Lawrence, assignor to Tyer Rubber Co., Andover, both in Mass.

1,982,593 and 1,982,594. **Engine Mounting.** R. S. Trott, Denver, Colo.

1,982,628. **Abrasive Wheel.** R. C. Benner and H. E. Stowell, assignors to Carborundum Co., all of Niagara Falls, N. Y.

1,982,649. **Coat Shield.** H. G. Dugan, Hinsdale, Ill.

1,982,658. **Flywheel.** W. R. Griswold, assignor to Packard Motor Car Co., both of Detroit, Mich.

1,982,808. **Golf Ball Practice Device.** O. A. Hendersen, Racine, Wis.

1,983,069. **Golf Club.** R. H. Cowdery, Geneva, assignor to American Fork & Hoe Co., Cleveland, both in O.

1,983,158. **Golf Club.** L. A. Young, Detroit, Mich.

1,983,238. **Antiskid Tire.** M. Mücklich, Dresden, Germany.

1,983,239. **Liquid Measure.** R. B. Munday, Oakwood, assignor to Cincinnati Ball Crank Co., Cincinnati, both in O.

1,983,317. **Trailer Coupling.** J. A. Seitz, Syracuse, N. Y.

1,983,507. **Storage Battery Case.** J. L. Woodbridge, assignor to Electric Storage Battery Co., both of Philadelphia, Pa.

1,983,548. **Track for Tracklaying Vehicles.** H. A. Knox, Davenport, Iowa, and C. Hiller, Jr., St. Louis, Mo.

1,983,636. **Elastic Belt and Suspenders.** L. F. Palkens, Nashua, N. H.

1,983,671. **Golf Tee Mat.** C. W. Kohler, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,983,713. **Sound Insulated Shaft Mounting.** F. H. Stearns, Highland Park, Mich., and O. Neumer, Glenside, Pa., assignors to S K F Industries, Inc., Philadelphia, Pa.

1,983,784. **Flexible Doorstop.** R. C. Watkins and J. May, both of San Francisco, Calif.

1,983,796. **Oscillating Pivot Joint.** H. D. Geyer, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.

1,984,011. **Garment.** H. A. Cornblum, Cleveland, O.

1,984,033. **Steering Wheel Vibration Absorber.** T. Ritchie, Locust Valley, N. Y.

1,984,038. **Electrical Cable and Cord.** G. B. Shaw and E. G. Sturdevant, both of Bristol, and C. W. Short, E. Providence, all in R. I., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

1,984,056. **Application of Coverings to Packages.** J. A. Clemens, assignor to Davol Rubber Co., both of Providence, R. I.

1,984,072. **Endless Track.** A. F. Masury, New York, and F. J. Kohlberger, Whitestone, assignors to International Motor Co., New York, all in N. Y.

1,984,084. **Tire Deflation Indicator.** G. B. Rodney, Fayetteville, N. C.

1,984,158. **Medical Pad.** W. M. Scholl, assignor to Scholl Mfg. Co., both of Chicago, Ill.

1,984,253. **Breast Protector.** T. L. Cox, W. Los Angeles, Calif.

1,984,275. **Distributer.** M. Mallory, Detroit, Mich., assignor to Mallory Research Co., Toledo, O.

1,984,326. **Lockstitch Knit Fabric.** J. Titone, Riverbank, assignor to Neidich Cel-Lus-Tra Corp., Burlington, both in N. J.

1,984,347. **Faucet Connection.** J. L. Sutton, Buffalo, and J. Van Walshauser, Kenmore, assignors to Sev, Inc., Buffalo, all in N. Y.

1,984,355. **Electric Wiring System.** C. W. Abbott, Larchmont, N. Y., assignor to Bryant Electric Co., Bridgeport, Conn.

1,984,413. **Vibration Damper.** R. K. Lee, Highland Park, assignor to Chrysler Corp., Detroit, both in Mich.

1,984,475. **Hose.** H. W. Goodall, Aldan, Pa.

1,984,577, 1,984,578, and 1,984,579. **Internal Combustion Engine.** W. R. Griswold, assignor to Packard Motor Car Co., both of Detroit, Mich.

1,984,585. **Hair Waver.** R. M. Keele, assignor to United States Appliance Corp., both of San Francisco, Calif.

1,984,610. **Collapsible Tube Vacuum Cup Cap.** H. Warren, Mansfield, O.

1,984,746. **Railroad Vehicle.** W. F. Kasper, Fairmont, Minn., assignor, by mesne assignments, to Austro-Daimler-Puchwerke A. G., Wiener-Neustadt, Austria.

1,984,803. **Battery Filler.** G. T. Marlowe, Vallejo, assignor to Standard Stations, Inc., San Francisco, both in Calif.

1,984,806. **Pipe Joint Gasket.** G. H. Pfefferle, assignor to S. R. Dresser Mfg. Co., both of Bradford, Pa.

1,984,910. **Waterproof Sheet Material.** E. H. Angier, assignor to E. H. An-

gier, as trustee, both of Framingham, Mass.

1,984,927. **Bag.** P. H. Henkel, assignor to Continental Rubber Works, both of Erie, Pa.

1,985,144. **Railway Vehicle Wheel.** E. Bugatti, Molsheim, France.

1,985,187. **Tire.** A. Miller, Thurso, Caithness, Scotland.

Dominion of Canada

346,274 and 346,275. **Cord and Rubber Belt.** R. J. Southwell and T. H. Wickwire, Jr., co-inventors, both of New York, N. Y., U. S. A.

346,285. **Garter.** W. J. Cuhel, St. Paul, Minn., U. S. A.

346,309. **Die Stamping Machine.** A. H. Rankin, Rochester, N. Y., U. S. A.

346,350. **Abrasive Article.** Carborundum Co., assignee of R. C. Benner, both of Niagara Falls, N. Y., U. S. A.

346,389. **Rubber Coated Article.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Roberts, Montclair, N. J., U. S. A.

346,396. **Floor Covering.** Mishawaka Rubber & Woolen Mfg. Co., assignee of G. W. Blair and J. F. Schott, co-inventors, all of Mishawaka, Ind., U. S. A.

346,429. **Nursing Bottle Adapter.** F. Brown, Philadelphia, Pa., U. S. A.

346,484. **Feeding Teat.** E. Spinetto, Auckland, New Zealand.

346,505. **Flexible Diaphragm.** Canadian Westinghouse Co., Ltd., Hamilton, Ont., assignee of E. E. Hewitt, Edgewood, Pa., U. S. A.

346,508. **Connector Cap.** Cutler-Hammer, Inc., Milwaukee, Wis., assignee of Daniel Woodhead Co., assignee of F. C. Kollath, both of Chicago, Ill., all in the U. S. A.

346,519. **Resilient Motor Mounting.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of C. Saurer, Akron, O., U. S. A.

346,566. **Electric Battery.** M. Wilderman, Monaco, Principality of Monaco.

346,574. **Bandage.** R. K. Beedle, Montreal, P. Q.

346,607. **Electric Iron Handle.** A. T. Lark, Detroit, Mich., U. S. A.

346,674. **Electrical Conductor.** General Cable Corp., New York, assignee of G. S. Lobdell, Pierrepont, both in N. Y., U. S. A.

346,699. **Gun Carriage.** Martin-Parry Corp., assignee of A. P. Buquor, both of York, Pa., U. S. A.

346,798. **Ball Flinger.** R. B. Philipp, Reutlingen, Germany.

346,917. **Shaving Brush.** W. Brodiak, inventor, and P. Malyj, assignee of ⅓ of the interest, both of Montreal, P. Q.

United Kingdom

414,008. **Tire.** F. Hollingsworth, Altrincham.

414,064. **Running Board Tread.** Dunlop Rubber Co., Ltd., London, and S. Sadler, Birmingham.

414,067. **Centrifugal Machine.** Aktiebolaget Separator, Stockholm, Sweden.

414,081. **Brick Lifter.** E. R. Sutcliffe, Lowton.

414,129. **Hose Suspender.** D. Jenkin, Malvern.

414,181. **Plate Heat Exchanger.** R. Seligman, London.

414,185. **Boiler.** T. E. Halliday, Sanderstead.

414,190. **Electric Battery Lamp.** Concordia Electric Safety Lamp Co., Ltd., and T. Stretton, both of Cardiff, Wales.

414,233. **Hose Pipe.** Magyar Ruggyantaarugyar Reszvenytarsasag and P. Klein, both of Budapest, Hungary.

414,236. **Watertight Wrist Watch Case.** J. Berenyi, Budapest, Hungary.

414,253. **Bottle Labeling Device.** Jagenberg-Werke A. G., Düsseldorf, Germany.

414,258. **Plant Receptacle.** S. A. Butler, Milford-on-Sea.

414,284. **Can Non-Return Valve.** J. J. V. Armstrong, Liverpool. (Continental Can Co., Inc., New York, N. Y., U. S. A.)

414,294. **Cement Applier.** I. L. Keith, Haverhill, Mass., U. S. A.

414,343. **Hot Water Bottle.** P. Kaufmann, Hannover, Germany.

414,395. **Shoe Protector.** F. P. Artigas, Mexico, D. F., Mexico.

414,424. **Tennis Practicing Appliance.** Kum-Bak Sports Toys & Games Mfg. Co., Ltd., and P. Lake, both of London.

414,505. **Stair Tread.** G. Spencer Moulton & Co., Ltd., Westminster, and A. Harris, Bradford-on-Avon.

414,519. **Printing Machine.** W. W. Triggs, London. (Schweiz, Lokomotiv- & Maschinenfabrik, Winterthur, Switzerland.)

414,539. **Counting Apparatus.** Deuta-Werke, Vorm. Deutsche Tachometerwerke Ges., Berlin, Germany.

414,567. **Artificial Flower Machine.** A. K. Nielsen, Odense, Denmark.

414,594. **Cycle Mudguard.** G. Pacileo, London.

414,607. **Game Appliance.** W. A. Taylor, Detroit, Mich., U. S. A.

414,618. **Corkscrew.** O. Vormelcher, Klemnitz, Germany.

414,655. **Concrete Mixer.** N. Harrison, Low Fell, and H. S. Field, Harlow.

414,656. **Printers' Composing Appliance.** H. B. Sanders, London; W. F. Flowers, Stanmore; and J. R. Bosman, Worcester Park.

414,668. **Undergarment.** H. R. Lindley, Sherwood.

414,706. **Joint Making Packing.** Lead Wool Co., Ltd., and F. Moulton, both of Kent.

414,711. **Pump Diaphragm.** P. Bechert, Saaz, Czechoslovakia, and R. Schmidt, Schönbühel, Austria.

414,713. **Cable Housing.** Pirelli-General Cable Works, Ltd., London, and J. L. Bishop, Southampton.

414,722. **Handle Grip.** J. Entwisle, Letchworth.

414,763. **Vehicle Suspension.** W. L. Paynter, Gateshead, and Forth Engine & Motor Works, Newcastle-upon-Tyne, Ltd., Newcastle-on-Tyne.

414,767. **Road Surfacing Material.** J. Cross, Bridgnorth, and A. T. McQuay, Birmingham.

414,782. **Bobbin Mounting.** Universal Winding Co., Boston, Mass., U. S. A.

414,788. **Pipe Coupling.** B.E.N. Patents, Ltd., and E. Elwess, both of London.

414,819. **Wireless Receiving Apparatus.** General Electric Co., Ltd., London, and R. Gosden, Coventry.

414,828. **Horseshoe.** Phillips Rubber Soles, Ltd., and G. F. Eyles, both of London.

414,831. **Windscreen Dimming Preventive.** J. L. and A. E. Taylor, both of Liverpool.

414,842. **Shoe Upper.** Rossendale Combining Co., Ltd., and J. A. Taylor, both of Waterfoot.

414,852. **Hand Truck.** Compressed Rubber Products, Ltd., Guildford, and A. J. Niblett, Reading.

414,864. **Door Antirattler.** Microvernier, Ltd., and A. S. Cheston, both of Birmingham.

414,880. **Switch Handle.** C. R. Golledge, Trowbridge.

414,882. **Vehicle Spring Suspension.** Alvis Car & Engineering Co., Ltd., and G. T. Smith-Clarke, both of Coventry.

414,900. **Pneumatic Despatch Carrier.** J. T. Needham, N. Plainfield, N. J., U. S. A.

414,913. **Aerial.** Ward & Goldstone, Ltd., and A. W. Webb, both of Pendleton, Salford.

414,929. **Reservoir Pen.** E. E. S. Wade, Liverpool.

415,019. **Wearing Apparel Stiffener.** E. Guilleaume, Brünn, Czechoslovakia.

415,020. **Hair Curler.** I. Klafter, Utrecht, Holland.

415,023. **Brassiere.** L. M. Jacks, London.

415,038. **Footwear.** Magyar Ruggyantaarugyar Reszvenytarsasag, P. Klein, and I. and L. Dorogi, all of Budapest, Hungary.

415,049. **Carpet Underlay.** A. Skipsey, St. Albans.

415,074. **Toy Boat.** C. H. Lyde, Droitwich.

415,100. **Draining Appliance.** Simmons Holloware Co., Ltd., and E. J. Caesley, both of Wolverhampton.

415,108. **Bucket Handle.** V. Rendle, Great Clacton.

415,122. **Universal Joint.** F. and A. Croft, both of Bradford.

415,174. **Lubricating Device.** London Passenger Transport Board, Westminster, and J. H. Condy, London.

415,198. **Elastic Fabric.** United States Rubber Co., assignee of P. Adamson, both of New York, N. Y., U. S. A.

415,228. **Door Stay.** F. Helliwell, Mytholmroyd.

415,246. **Fire Alarm System.** F. A. S. Gwatkin, London. (Garrison Fire Detecting System, Inc., New York, N. Y., U. S. A.)

415,264. **Dental Impression Apparatus.** L. Kalvin, New York, N. Y., U. S. A.

415,272. **Cycle Driving Transmission.** J. Endersen, Farrenferris, Co. Cork, Irish Free State.

415,276. **Lacing Fastening.** M. Mayer, Amberg, Bavaria, Germany.

415,300. **Card Clothing.** W. Otto, Leisnig, Saxony, Germany.

415,309. **Paper Machine Shaker.** W., H., and H. Voith (trading as J. M. Voith), all of Wurtemberg, Germany.

415,318. **Tire.** M. Mucklich, Dresden, Germany.

415,321. **Hollow Roller.** F. Krupp Grusonwerk A. G., Magdeburg, Germany.

415,334. **Electric Battery Lamp.** Bluemel Bros., Ltd., Wolston; F. W. Bluemel, Coventry; C. E. Bruce, Middlesex; and F. P. Swann, London, (representatives of F. H. Bluemel).

415,346. **Crystallizing Apparatus.** Akt.-Ges. Der Chemischen Produkten-Fabriken Pommerensdorf-Milch and R. Siegler, both of Stettin, Germany.

415,353. **Metallic-Vapor Apparatus.** U. Lamm and Allmanna Svenska Elektriska Aktiebolaget, both of Västeras, Sweden.

(*Continued on page 66*)

Editor's Book Table

NEW PUBLICATIONS

"DuPrene. A Story of Man-Made Rubber." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. This small illustrated booklet contains the first really popular description of DuPrene. Of particular interest is the clear and understandable explanation of how it is synthesized from such abundant natural raw materials as coal and limestone. Other phases of the general subject of the booklet include "DuPrene Is Processed by Rubber Machinery," "Many Kinds of DuPrene Compositions," "Costs More Than Natural Rubber," "Special Properties," "Many Industrial Applications," and "Engineering Service."

"Furnace Linings and Arches. Design, Installation and Service Advantages for Modern Boiler Furnaces." McLeod & Henry Co., Troy, N. Y. This 32-page illustrated catalog deals particularly with "Steel Mixture" fire clay furnace linings and arches. These refractories are heavily tongued and grooved shapes that will not become plastic or fuse below 3,180° F. and are sufficiently strong to withstand the load of any properly designed boiler settings.

"Index to A.S.T.M. Standards and Tentative Standards." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. This pamphlet is designed to be of service in determining whether the A.S.T.M. has issued any specifications or test methods on particular materials or subjects in the materials field. All the A.S.T.M. specifications and tests are listed in the current Index under appropriate key words, and the items under a particular subject are arranged alphabetically according to the significant word in the title, thus facilitating use of the Index. A list in numeric sequence of the serial designations is also included.

"Goodrich Engineering Data, Industrial Rubber Goods." The B. F. Goodrich Co., Akron, O. This pamphlet of 24 pages is described as a guide to the selection of belting, hose, and other products. It describes over 200 rubber items and is illustrated with more than 100 diagrams and photographs. Included in the section on transmission belting is a discussion of the relative merits of rubber and leather, a review of belting requisites for a wide variety of uses as well as helpful tips on installation procedure. Supplementing the information on conveyer belting, hose, rubber lining, and many other products are glossaries, tables, and technical data of wide general interest.

BOOK REVIEWS

"Handbuch der Gesamten Kautschuktechnologie." ("Complete Handbook of Rubber Technology.") Two volumes. Edited by Dr. Ernst A. Hauser, in collaboration with 32 specialists. Linen, 1,066 illustrations, numerous tables. Author and subject indices. Published in German by Union Deutsche Verlagsgesellschaft, Berlin, Germany. Price, RM 280.

These tomes fill the long-felt need of a comprehensive work covering all fields using rubber, so as not only to permit a general view of the whole industry to outsiders, but also to elucidate for chemists and engineers those rubber problems more removed from their special fields.

Volume I begins with full details, by Fritz Frank, Berlin, on the chemical testing of rubber, covering the chemical laboratory as a testing field for raw materials, etc., and finished goods. Next Colin Macbeth, Birmingham, England, deals with rubber machines. "Compounding," by Joseph and Anselm Talalay, both of London, England, embraces the behavior of compounding ingredients in rubber (except accelerators) and making the mixes. Paul Alexander, Berlin, writes about rubber reclaim, and Walter Alexander, Altona-Blankensee, Germany, about factice. Next P. Kluckow, Lutherstadt Wittenberg, Germany, discusses mechanical rubber goods, dealing with requirements in raw rubber and fillers and making technical compounds, including vulcanization and the actual production of technical goods.

R. P. Dinsmore, Akron, O., elaborates on tires under the headings: cycle tires; development of the automobile tires; pneumatic tires, covering the theory of pneumatics, plan for pneumatics, tire construction, and methods of production; solid tires; inner tubes; compounds; and the use of fabrics in manufacturing tires.

The appendix starts with 2 features: "Rail Cars with Rubber Tires" and "Highly Elastic Solid Tires," by L. Herzl, Traiskirchen, Austria, followed by: "The Use of Rubber in Railroad Vehicles," by Mr. Macbeth; "The Use of Rubber in the Construction of Automobiles," Dr. Hauser; "Erasing Rubber," J. Talalay; "Rubberized Fabrics," Erich Wurm, Hannover, Germany; "Rubber Belting and Conveyer Belts," Kurt Hesse, Berlin; "Balloon Fabric," Anton Fischler, Frankfurt a.M., Germany; "Imitation Leather," Walter Münzinger, Heidelberg, Germany; "Imitation Suede," Jean Marconnet, Montreuil - Sous - Bois, France; "Rubber Plasters," Hans W. Albu, Hamburg, Germany; and "Solvent Recovery in the Rubber Industry," A. Engelhardt, Frankfurt a. M.

Volume II first considers toy balls and similar hollow bodies, by H. Kassner, Wimpassing, Austria. Next come discussions on tennis balls, from Slazengers, Ltd., London, and on manufacturing golf balls, by W. J. Perry, of The Silvertown Co., both of London, followed by "Rubber Toys," by Stefan Dorogi, Albertfalva, and F. Gabor, Budapest, both in Hungary, covering: introduction; solid and hollow molded toys; inflatable toys; and appendix, treating of swimming and beach toys, toys improved by coating with fiber dust, and the patent situation.

The next part of Volume II is devoted to manufacturing seamless dipped goods, by F. Thiele, Leipzig, and Dr. Wurm. The same authors then discuss patent rubber (cut sheet), followed by an article on rubber small wares, by Dr. Wurm. J. Talalay next reviews rubber footwear, including the construction of a rubber shoe and the manufacturing procedure.

Next come: "Sponge Rubber," by S. A. Brazier, Birmingham; "Rubber Flooring," by W. H. Reece, Leyland, England; "Rubber Roads," L. Gaisman, Audenshaw, England; "Rubber Thread," Max Draemann, Cologne, Germany; "It-Packing," Heinrich Pahl, Dusseldorf, Germany; "Rubber Insulated Conductors," R. A. Schatzel, of General Cable Corp., both of Rome, N. Y.; "Hard Rubber," Dr. Kassner; "Covering Metals with Rubber," Eduard Vossen, Cologne; "Rubber in Friction Elements," Jas. Driscoll, of Johns-Manville Corp., both of New York, N. Y.; "Dental Rubber," Dr. Wurm; and "Polishing and Grinding Preparations with Rubber as Binder," R. C.

Benner and O. L. Mahlman, both of Niagara Falls, N. Y.

Then Dr. Hauser reviews the complete technology of latex. F. F. Kirchhof, Harburg, Germany, contributed the 2 concluding chapters: "Oxidation and Aging of Rubber with Special Consideration of Protection against Aging and Accelerated Aging Tests of Rubber Products" and "Rubber Derivatives and Artificial Isomers of the Natural Rubber Hydrocarbons."

From the above it is quite evident that this monumental work deserves the attention of all connected with the rubber industry. Certainly any one who can should procure these 2 volumes, which will prove invaluable for ready and constant reference.

"The Science of Rubber." Edited by Prof. Dipl.-Ing. K. Memmler, director of Staatliche Materialprufungsamt at Berlin-Dahlem, Germany, in collaboration with L. Hock, E. Kindscher, A. Koch, H. Pohle, R. Pummerer, A. Schob, A. Zimmermann. Authorized English translation edited by R. F. Dunbrook, Ph.D., and V. N. Morris, Ph.D., of The Research Staff of the Firestone Tire & Rubber Co. Book Department, Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1934. Bibliography. Author Index. Subject Index. Illustrated with 213 figures in the text and 4 color plates. Cloth, 770 pages, 6 by 9½ inches. Price $15.

In this volume rubber technology and manufacturing gives way to the fundamentally scientific aspects of rubber. Following a brief historical introduction of the discovery and technical and economic development of rubber, the results of its scientific study on the part of many authorities are quoted and interpreted with copious references to original sources. The scope of the work is outlined by the following table of contents: Introduction, Botany, Chemistry, Vulcanization, Chemical and Physical Testing Methods, Physics of Rubber, Physical Testing Methods, Microscopy of Technical Vulcanizates, Bibliography, Author Index, Subject Index.

The bibliography, covering 56 pages, includes 1,746 entries and is the most complete compilation of references to books and pamphlets on the cultivation, properties, and uses of rubber and allied substances ever published in one place. The editors and their associates deserve the unstinted praise of all interested in the solution of rubber scientific problems for this authoritative digest of research progress already achieved by rubber scientists the world over.

GENERAL

United Kingdom

(*Continued from page* 64)

415,374. **Tie and Scarf.** T. L. Shepherd, Brighton.

415,484. **Electrostatic Machine.** British Thomson-Houston Co., Ltd., London, assignee of C. A. Nickle, Schenectady, N. Y., U. S. A.

415,487. **Fish Net Float.** W. F. Proctor, Aberdeen, Scotland.

415,496. **Road Surface Drier.** G. O. Ritchie, London.

415,501. **Twine Holder.** W. Robertson and C. W. Oxley, both of Leeds.

415,543. **Road Junction.** C. Lucey, North Harrow.

415,643. **Cow Milker.** J. G. Bullock, Melksham.

415,662. **Apron.** A. J. Clare, Somerset.

415,666. **Massage Appliance.** G. Briggs, London.

415,673. **Foot Exerciser.** J. S. Bach, Toronto, Canada.

415,690. **Telephone Supporter.** S. Altschuler, Brussels, Belgium.

415,708. **Sponge.** L. Kornitzer, London.

415,808. **Railway Vehicle Axle Truck.** G. Constantinesco, Coniston.

415,833. **Thermostat.** Serck Radiators, Ltd., and J. L. Smith, both of Birmingham.

415,836. **Game Practicing Appliance.** R. G. Norris, Liverpool.

415,882. **Fastening.** J. Gibby, Kew, Victoria, Australia.

415,904. **Paper Machine Roll.** W. H. Millspaugh, Sandusky, O., U. S. A.

415,928. **Ribbed Warp Fabric.** P. Schonfeld, Chemnitz, Germany.

415,933. **Wringer Stand.** Acme Wringers, Ltd., and J. W. Burt, both of Glasgow, Scotland.

415,936. **Paving Block.** A. Boschi and Soc. Italiana Pirelli, both of Milan, Italy.

415,943. **Garter.** H. Seabrook, London. (W. Naef, Küsnacht, Switzerland, and A. Barrelet, Paris, France.)

415,952. **Vehicle Spring Suspension.** Daimler-Benz A. G., Stuttgart, Germany.

415,989. **Shaving Brush.** E. L. H. Cosby, London.

416,045. **Sisal Decorticator.** W. J. Hollier, St. Louis, Mo., U. S. A.

416,046. **Sheet Delivery Apparatus.** E. A. Timson, Kettering.

416,052. **Elastic Valve.** H. S. Hughes, Windsor.

416,069. **Egg Cleaner.** Cope & Cope, Ltd., and W. J. Cope, both of Reading.

416,113. **Foundation Garment Elastic Fabric.** United States Rubber Co., assignee of P. Adamson, both of New York, N. Y., U. S. A.

416,145. **Watering Can Rose.** E. Chetham, London.

416,167. **Sole.** W. Hughes, Southend-on-Sea.

416,203. **Corset.** E. Carlsen, Copenhagen, Denmark.

416,215. **Weighing and Filling Machine.** Lafarge Aluminous Cement Co., Ltd., and C. M. Kay, both of London.

416,222. **Vehicle Wheel.** B. Van Loutzkoy, Berlin, Germany.

416,229. **Wringer.** Acme Wringers, Ltd., and J. W. Burt, both of Glasgow, Scotland.

416,235. **Trousers.** C. Horne and M. & N. Horne, Ltd., both of London.

416,248. **Vibratory Massage.** E. A. Binney, Ilkley.

416,254. **Undergarment.** B.V.D. Co., Inc., assignee of M. S. Erlanger, both of New York, N. Y., U. S. A.

416,262. **Tailor's Measuring Jacket.** C. De Angelo, Seine-et-Oise, France.

416,272. **Windscreen Dimming Preventive.** E. R., E. E., and E. Nier and J. M. Ehmer (trading as Nier & Ehmer, Metallwarenfabrik), all of Beierfeld, Saxony, Germany.

416,295. **Marking Instrument.** Carfax Cards, Ltd., and G. Rabinowitsch, both of London.

416,343. **Motor Car Aerial.** N.R.S., Ltd., and H. S. Prince, both of London.

416,373. **Printing Apparatus.** J. S. Wheelwright, Tonbridge, and G. H. Abell, Esher.

Germany

606,277. **Tire.** A. Miller, Thurso, Caithness, Scotland. Represented by B. Kugelmann, Berlin.

606,311. **Hose.** Giessener Gummiwarenfabrik Poppe & Co., Giessen.

606,370. **Fabric-covered Hollow Rubber Toys.** Ungarische Gummiwarenfabrik, A.G., Budapest, Hungary. Represented by J. Reitstötter, Berlin-Steglitz.

607,258. **Endless Metal Band for Vulcanizers.** G. Roese, Stettin.

607,267. **Boot.** Helsingborgs Gummifabriks Aktiebolag, Helsingborg, Sweden. Represented by G. Weissenberger and M. Schulte, both of Kemminghausen.

607,546. **Resilient Rail-Car Wheel.** Continental Gummi-Werke, A.G., Hannover.

607,582. **Anti-skid Cover for Pneumatic Tires.** E. Eschmann, Zurich, Switzerland. Represented by B. Hilliger, Berlin.

TRADE MARKS

United States

319,450. Label containing the words: **"H & B 'A Mark of Quality.' 'A Sign of Service;'"** and below the label the words: **"H & B Trade Mark."** Packing. Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

319,473. Representation of 2 barber poles, and between them the word: **"Riteway."** Combs. American Hard Rubber Co., Hempstead, N. Y.

319,503. **Dritex.** Adhesive, bandage, and foot plaster. Scholl Mfg. Co., Inc., Chicago, Ill.

319,541. Two circles, each consisting of a white outer circle and a black inner one. Golf balls. Acushnet Process Co., Acushnet, Mass.

319,560. Label containing representation of a boy's head, and the words: **"Kinney's Reg'lar Guys."** Tennis shoes. G. R. Kinney Co., Inc., New York, N. Y.

319,890. Representation of a man holding a sign containing the word: **"Rich-lin."** Tires and tubes. D. Stern, Paterson, N. J.

319,899. **Skintex.** Adhesive, bandage, and foot plaster. Scholl Mfg. Co., Inc., Chicago, Ill.

320,012. Representation of an ant, and above it the word: **"Ant."** Tire and tube repair patches. B. B. Baber, Albuquerque, N. Mex.

320,089. Representation of a diamond containing the word: **"Bilt-Rite."** Sport goods including tennis and golf balls, etc. Manhattan Novelty Co., New York, N. Y.

320,112. **Tri-wide.** Adhesive plaster. Johnson & Johnson, New Brunswick, N. J.

320,131. **Stretch-tex.** Narrow elastic webbing. American Mills Co., West Haven, Conn.

320,135. **Representation of a barracuda, and the words: "Barracuda Zephyr-weight."** Raincoat fabrics. Coolev Finishing Co., Pawtucket, R. I.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Dec. 1	Dec. 29	Jan. 5, 1935	Jan. 12	Jan. 19	Jan. 26
Dec.	13.05	....	....	....	....	....
Jan.	13.15	12.95	13.55	13.29	13.05	12.56
Feb.	13.26	13.06	13.65	13.39	13.12	12.63
Mar.	13.38	13.18	13.75	13.51	13.21	12.72
May	13.58	13.37	13.95	13.69	13.34	12.86
July	13.76	13.58	14.17	13.85	13.53	13.01
Sept.	13.97	13.77	14.37	14.07	13.72	13.17
Oct.	14.07	13.87	14.46	14.17	13.81	13.22
Nov.	14.17	13.97	14.55	14.27	13.90	13.31
Dec.	....	....	14.64	14.37	13.99	13.40
Volume for week (tons).	21,270	6,910	20,370	17,010	26,560	13,180

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of this review. This plan permits tracing at a glance the trend of prices on each future for approximately 2 consecutive months.

No. 1 ribbed smoked sheet futures remained very near the 13¢ level throughout December as was true also during November. The price held firm in spite of an almost total absence of factory demand during the pre-inventory and holiday period.

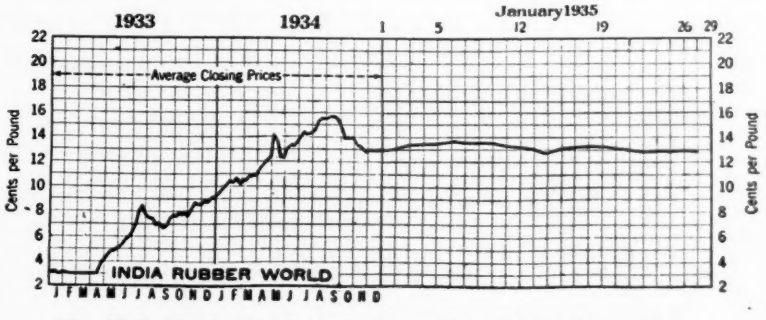
Week ended December 29, 1934. With foreign markets closed until Thursday and outside demand being practically nil, the market was very quiet, and trading confined to the smallest volume of any of the small-volume weeks of December. Prices receded somewhat each day except the last when outside demand and favorable reports brought prices up to within 18 to 20 points of the previous week's close. January, for example, closed at 12.95¢ and February, 13.06¢. News of a bullish nature was plentiful as the year drew to a close: Akron manufacturers, while taking inventory, were also making preparations for higher production immediately after New Year's. A Cleveland financial authority, according to *The Journal of Commerce,* reported that about 3,000,000 more tires had been produced in 1934 than in 1933 and that the outlook for 1935 would bring a further increase of 7 to 10%, or a total output of approximately 45,600,000 units. F. A. Seiberling predicted another 10% price increase within 2 months. Exports of rubber goods during the first 10 months of 1934 were ⅓ higher than in the corresponding periods in 1933 and 1932, being $18,450,137, $14,080,537, and $13,814,283 respectively. A Reuter's cable from Amsterdam reported that the Netherlands Rubber Trade Association stressed the importance of permanent regulation in its annual report. Another from Batavia indicated that the N.E.I. Governor-General will preside at a meeting of the high council, January 21, to determine the future basis for native rubber restriction. Banka, Riouw, Borneo, and Sumatra will be represented by directors of civic, economic, financial, and regional civil service affairs.

Week ended January 5, 1935. The Commodity Exchange opened December 31 for trading until noon, then closed for the New Year's holiday, resuming business again January 2, 1935. Lively covering by trade and speculative interests over the holiday contributed to sharp advances at the opening Monday, which increased during the session to 17 to 22 points above the previous close, January, 13.12¢ as against Saturday's close, 12.95¢. The increase continued throughout the period, closing 40 to 60 points above the previous week's close; distant months registering the lower gains. Bullish sentiment in the manufacturing industries, and general confidence that the restriction plan is workable and will become increasingly effective seemed to cause the upward trend of the period rather than any particular activity in the outside market. Revival of the inflation rumor and unexpected strength in the London market were also contributing factors.

Week ended January 12. This period started by continuing the increases of last week, closing Monday with further gains of 13 to 19 points, bringing January to 13.74¢ against Saturday's close, 13.55¢. Buying activities in the trade and strength of domestic commodities seemed to outweigh, in effect, the sagging foreign prices and the President's budget revelations. Mild reaction, however, set in January 8, with losses 0 point to 3 points, and slackened activity accelerated the reaction January 9 to further recessions of 11 to 14 points. Very restricted factory demand and downturns in other commodities, rather than any unfavorable developments in the rubber situation, apparently caused the sag. Underlying firmness of the rubber market is evidenced by foreign market steadiness, also by the slight upturn of local prices, 1 point to 4 points, January 10, despite the very low 96 contract turnover and very little outside activity. A sharp recession characterized the final 2 days of the period because of expectations that the gold policy of the Government would not be upheld by the Supreme Court, also rumors that employes of one of the large Akron tire manufacturers were planning to strike. Domestic problems engaged the attention of traders to the exclusion of everything else, and these being bearish in tone caused the week to close with losses of 25 to 30 points.

Week ended January 19. This period started in still lower levels because of further selling influenced by the gold fear, poor outside demand, and easy cables from abroad. Besides these factors a sharp drop in sterling caused the market to break badly Tuesday.

Speculative liquidation resulted in the heavy turnover of 11,950 tons for the day and price recessions of 23 to 53 points, January 12.95¢ against the previous close 13.18¢; while the distant months registered the greater losses. Slight recoveries followed, and steadiness prevailed during the remainder of the week. Reinstatement of some speculative lines, restoration of confidence regarding the gold and exchange situation, fair factory inquiry, and notice of the favorable December statistics seemed to be the responsible considerations. The week, however, closed with the rather sharp recessions of 24 to 38 points as compared with the previous week's close. A Reuter's dispatch from Batavia indicated that D.E.I. will continue the export duty of 16¢ per kilo



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

fixed December 16 to stimulate native production from below the prescribed quota. The holding regulations set December 15 will also continue: Natives can hold stocks not exceeding twice their monthly garden production; recognized dealers and owners can hold over 100 kilos; recognized exporters are permitted combined stocks up to 1/10 of the regional quota; and second-hand dealers are limited to holding rubber not over a fortnight.

Week ended January 26. Reflecting the general uncertainty of the Washington situation as felt by speculative interests, the futures market began this period with declining prices, represented by Monday closing February at 13.03¢ against 13.12¢ Saturday. The bearish atmosphere prevailed throughout the week; prices continued the decline, closing 49 to 59 points below the previous week.

New York Quotations

New York outside market rubber quotations in cents per pound

	Jan. 26, 1934	Dec. 26, 1934	Jan. 26, 1935
Plantations			
Rubber latex, normal .....gal.	72	54	54
Sheet			
Ribbed smoked, spot	9 11/16 / 9¾	12 7/8 / 12 13/16	12¾ / 12 7/8
Jan.-Mar.	9¾ / 9 13/16	13 1/16 / 13 1/16	12 7/8 / 13
Apr.-June	10 1/16 / 10 5/16	13 3/8 / 13 1/16	13 / 13 1/4
July-Sept.	10 1/16 / 10 3/8	.. ..	13 3/8 / 13 1/2
Crepe			
No. 1 thin latex, spot	11 1/16 / 11 1/4	13 1/4 / 13 3/8	13 / 13 1/8
Jan.-Mar.	11¼ / 11 5/16	13½ / 13 5/8	13 3/8 / 13 1/4
Apr.-June	11½ / 11 7/16	13¾ / 13 7/8	13 3/8 / 13 1/2
July-Sept.	11¾ / 11 13/16	.. ..	13 5/8 / 13 3/4
No. 3 Amber, spot	7 3/8 / 7 1/2	10 7/8 / 10 13/16	11 / 11 1/8
No. 1 Brown	7½ / 7 5/8	11 1/16 / 11 5/8	11 / 11 1/4
Brown rolled	5½ / 5 7/8	9¾ / 9 7/8	10 1/16 / 10 3/8
Paras			
Upriver fine	9	9¼	9 1/8
Upriver fine	*11¾	*12¾	*12¾
Upriver coarse	6	7	7
Upriver coarse	*10½	*10¾	*11
Islands fine	8½	9	8¾
Islands fine	*11¼	*12¼	*12¾
Acre, Bolivian fine	9¼	9½	9¼
Acre, Bolivian fine	*12	*12 1/8	*13
Beni, Bolivian	9¼	9¾	9¾
Madeira fine	9	9 3/8	9 1/8
Caucho			
Upper ball	6	7	7
Upper ball	*10¼	*10¾	*11
Lower ball	..	6½	6¾
Pontianak			
Bandjermasin	6	6	6¼
Pressed block	11	10	11
Sarawak	6	6	6½
Manicobas			
Manicoba, 30% guar.	†5	..	..
Mangabiera, thin sheet	..	..	..
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13
Africans			
Rio Nuñez	12	12	12
Black Kassai	10	10	10
Prime Niger flake	18	25	25
Gutta Percha			
Gutta Siak	10½	9⅛	9¾
Gutta Soh	15	14	14½
Red Macassar	1.50	1.50	1.40
Balata			
Block, Ciudad Bolivar	40	38	36
Manaos block	32	32	32
Surinam sheets	42	38	40
Amber	47	43	43

*Washed and dried crepe. Shipments from Brazil. †Nominal.

New York Outside Market

No. 1 ribbed smoked sheets maintained prices in the region of 13¢ from the beginning of November to the end of the year. Periods of little or almost total absence of trade demand have not disturbed this firm undertone. The trend during that period and since is revealed by the following week-end closing prices: November 3, 13¢; December 1, 13 1/16¢; December 29, 12 7/8; January 5, 13½; January 12, 13 1/16; January 19, 13 3/16; January 26, 12 5/8.

Week ended December 29, 1934. The first 2 days of this period were given to holidays. Business was resumed December 26, but to a negligible demand, which characterized all but the last day of the period. Factories were giving attention to inventory matters rather than to buying although whenever sellers made a reduced offering, it was accepted. The period closed at 12 7/8¢, but with a bullish sentiment caused by the reports of expanded production to begin with the new year.

Week ended January 5, 1935. Even though most factories were closed until after the New Year holiday, the No. 1 ribbed smoked sheet price assumed a firm position at the higher 13 1/8¢ level from the beginning of this period. Tire factories resumed operations January 2 on substantially increased schedules. Factory demand began to appear as the week closed with the price steady and firm at 13½¢. First quarter consumption in 1934 was 128,119 tons; while the second quarter absorbed 128,201 tons. *The Journal of Commerce* reports that it is estimated that 1935 first quarter consumption will be at least 10% higher than last year and that of the second quarter 1935 will be substantially higher than that of 1934.

Week ended January 12. Responding to the activity of the futures market rather than to outside trade requirements, this period began with a 7/16¢ gain, at 13 11/16¢. Continuing to follow the pattern of the futures market, the remainder of the week trended downward to 13 5/16¢. Crude rubber consumption in December, 1934, was 36,662 long

Tire Production Statistics

	Pneumatic Casings—All Types		
	Inventory	Production	Total Shipments
1932	6,115,487	32,067,732	32,200,820
1933	7,110,456	36,243,384	35,274,970
1934			
Jan.	9,393,857	3,803,939	3,125,726
Feb.	10,403,282	4,205,039	3,186,363
Mar.	11,301,142	5,024,718	4,096,273
Apr.	11,621,310	4,626,881	4,305,227
May	10,792,770	4,322,536	5,171,748
June	9,912,780	4,211,905	5,071,403
July	9,153,712	3,252,251	4,032,689
Aug.	8,436,236	3,426,652	4,179,022
Sept.	8,166,339	2,847,879	3,087,416
Oct.	8,397,095	3,188,295	2,919,423
Nov.	8,515,619	3,240,603	3,095,369
	Solid and Cushion Tires		
1932	23,830	97,089	108,581
1933	.....	130,987	126,990
1934			
Jan.	29,971	13,792	13,946
Feb.	.....	12,440	12,797
Mar.	28,280	15,017	15,273
Apr.	.....	16,217	13,701
May	.....	18,639	17,551
June	.....	21,385	19,487
July	.....	18,283	17,807
Aug.	.....	17,864	16,283
Sept.	.....	14,676	13,275
Oct.	.....	16,594	15,261
Nov.	.....	16,231	16,806
	Inner Tubes—All Types		
1932	5,399,551	29,513,246	30,328,536
1933	6,251,941	34,044,689	33,112,472
1934			
Jan.	8,150,708	3,444,574	3,102,931
Feb.	8,892,154	3,956,082	3,223,591
Mar.	9,936,574	5,038,649	3,994,683
Apr.	10,267,331	4,593,370	4,212,020
May	9,741,304	4,228,239	4,754,683
June	8,531,574	3,974,408	5,149,951
July	7,811,828	3,425,352	4,193,210
Aug.	7,328,404	3,569,626	4,072,352
Sept.	7,409,888	3,016,845	2,933,743
Oct.	7,906,614	3,122,579	2,608,593
Nov.	8,247,408	3,073,596	2,683,521

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%)
	Cotton Fabric Pounds	Crude Rubber Pounds	Gallons
1932	128,981,222	416,577,533	15,703,800,000
1933	148,989,293	512,489,423	15,880,746,000
1934			
Jan.	16,437,210	59,957,163	1,239,798,000
Feb.	18,720,923	63,400,171	1,047,816,000
Mar.	20,927,389	75,636,859	1,298,472,000
Apr.	19,371,041	69,930,591	1,374,870,000
May	18,785,428	67,636,897	1,601,922,000
June	17,715,577	61,849,622	1,524,432,000
July	13,267,392	49,352,977	1,583,190,000
Aug.	13,724,148	50,419,339	1,635,186,000
Sept.	12,942,100	44,496,192	1,469,328,000
Oct.	13,169,132	45,894,989	1,576,848,000
Nov.	15,382,268	52,565,247	1,463,238,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 80% for previous years, with the exception of gasoline consumption.

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

	December, 1934							January, 1935														
	24*	25*	26	27	28	29	31	1*	2	3	4	5	7	8	9	10	11	12	14	15	16	17	18	19
No. 1 Ribbed Smoked Sheet	..	..	12 7/8	12 13/16	12¾	12 7/8	13 1/16	..	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 3/8	13 3/8	13 3/8	12 15/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
No. 2 Ribbed Smoked Sheet	..	..	12 3/8	12 1/8	12 1/16	12 1/16	12 1/2	..	12 1/2	12¾	12¾	12¾	13	12 7/8	12 13/16	12 13/16	12 5/8	12 1/16	12 1/16	12 1/4	12 1/16	12 1/4	12 1/4	12 1/16	12 1/16
No. 3 Ribbed Smoked Sheet	..	..	12 1/16	12	12	12 1/16	12 1/4	..	12 1/16	12 5/8	12 5/8	12 5/8	12¾	12 5/8	12 1/16	12 1/16	12 3/8	12 1/16	12 1/4	12	12 1/16	12 1/8	12 1/8	12 1/8	12 1/8
No. 4 Ribbed Smoked Sheet	..	..	11 13/16	11 7/8	11 7/8	11 13/16	12 1/8	..	12 1/16	12 1/2	12 1/2	12 1/2	12 5/8	12 1/2	12 1/16	12 1/16	12 1/4	12 1/16	12 1/16	11 7/8	11 13/16	12	12	12	12
No. 1 Thin Latex Crepe	..	..	13 1/4	13 1/4	13 1/4	13 1/16	13 1/2	..	13 5/8	13 7/8	13 7/8	13 7/8	14 1/8	14	13 7/8	13 7/8	13¾	13¾	13 5/8	13 1/8	13 3/8	13 3/8	13¼	13¼	13¼
No. 1 Thick Latex Crepe	..	..	13	13	13	13	13 3/8	..	13 3/8	13 5/8	13 5/8	13 5/8	14	13 7/8	13 5/8	13 5/8	13 1/2	13½	13 3/8	13 1/8	13 1/8	13¼	13 1/8	13 1/8	13 1/8
No. 1 Brown Crepe	..	..	11 1/16	10 11/16	10 11/16	11	11 1/4	..	11¼	11½	11½	11½	11¾	11¾	11 5/8	11 5/8	11½	11 1/16	11 1/16	11	11 1/8	11 1/8	11 1/16	11 1/16	11 1/16
No. 2 Brown Crepe	..	..	10 11/16	10 11/16	10 11/16	10 7/16	11	..	11	11¼	11¼	11¼	11½	11½	11 3/8	11 3/8	11¼	11	11 1/16	10¾	10 7/16	10 11/16	10 11/16	10 11/16	10 11/16
No. 2 Amber	..	..	11 1/16	11	11	11	11 1/4	..	11¼	11½	11½	11½	11¾	11¾	11 5/8	11 5/8	11 1/16	11 3/16	11 3/16	11 1/16	11 1/16	11¼	11¼	11¼	11¼
No. 3 Amber	..	..	10 7/16	10¾	10¾	10 7/16	11 1/16	..	11 1/16	11 1/16	11 1/16	11 1/16	11½	11½	11 3/8	11 3/8	11 1/16	11 1/16	11 1/16	10 13/16	11	11	11	11	11
No. 4 Amber	..	..	10 1/16	10 3/16	10 3/16	10 3/16	10 5/16	..	10 5/8	10 7/16	10 7/16	10 7/16	11¼	11¼	11	11	10 7/16	10¾	10¾	10½	10 5/16	10 5/8	10 5/16	10 5/16	10 5/16
Rolled Brown	..	..	9¾	9¾	9¾	9 7/8	9 15/16	..	10	10 1/16	10 1/16	10 1/16	10 5/16	10 5/8	10 1/2	10½	10 3/8	10	10 1/16	10 1/8	10 1/16	10 1/16	10 3/8	10 3/8	10 3/16

* Holiday.

tons, 5.2% higher than November, 1934, and 27.5% higher than in December, 1933. Consumption for the year 1934 was 454,350 long tons, compared with 401,000 long tons in 1933. Consumption in 1934 has been exceeded by but one previous year, 1929, with an absorption of 467,400 long tons.

Week ended January 19. Firestone plant workers voting not to strike had something of a constructive effect on the outside market, although the break of futures Tuesday depressed spot prices of smoked sheet below the 13¢ level to 12⅞¢. Factory demand raised this price quickly, and it remained at 13¢ or above throughout the remainder of the week which closed at 13 3/16. Off grades, browns, and ambers fluctuated with standard sheets, thus maintaining the usual differentials. Rolled brown crepe, however, remained quite steady at 10¾¢. Certain factories were manifesting increased interest in Upriver coarse, Caucho Ball, and Esmeralda scrap at 7½¢ as substitutes for the higher priced plantation varieties.

Week ended January 26. Manufacturer interest was particularly good in the fore part of this period, but sagged noticeably by mid-week. The spread of buying and selling ideas was conducive to sagging prices. News of a noteworthy character consisted of wage increases in Akron factories, benefiting approximately 30,000 workers, and discussions of tire price increases of from 5 to 10% to be effective March 1. No. 1 ribbed smoked sheet declined ⅜¢ during this week to 12⅝¢.

Company Reports

The General Tire & Rubber Co., Akron, O. An increase of nearly $4,000,000 in gross sales during the past year resulted in a net profit to the company of $679,198.69, equivalent to $5.79 per share on the common stock, after provision for federal income tax. Sales were $19,881,022.52, as compared to $16,197,862 in 1933. Earnings compared with $2.67 a share on the common stock in 1933 and 15¢ a share in 1932. Current assets on November 30 were $7,099,647.20 against current liabilities of $1,194,498.85, making a current ratio of approximately 6 to 1. Land, buildings, machinery, and equipment in Akron were carried at a depreciated value of $1,933,601.60; while distributing branches outside of Akron are placed at $1,048,780.22, making a total net property account of $2,982,381.82. At the end of the year the company had outstanding 6% cumulative preferred stock amounting to $2,986,700, having retired $127,800 during the year.

Total surplus in 1934 was shown to be $4,045,256.70 as compared with $3,845,836.13 during 1933. The company has no bonded indebtedness or other fixed interest charges.

Lee Rubber & Tire Corp., Conshohocken, Pa. Year ended October 31: net income, after expenses, depreciation, interest, taxes, and other charges, $326,870, equal to $1.28 a share on 254,465 capital shares, exclusive of 45,535 shares held in treasury. This compares with $260,607, or $1.01 a share on 258,965 shares, exclusive of stock held by company, in preceding fiscal year.

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	12 Mos., 1934 No.	%	12 Mos., 1933 No.	%
Low Pressure (1933)				
15x3.00D	313	0.0	.....	...
15x5.00E	.....	...	35,499	0.4
15x5.50E	6,603	0.1	27,668	0.3
15x6.00E	208	0.0	.....	...
16x3.50D	25	0.0	189	0.0
16x4.00D	1,736,761	14.1	967,354	11.2
16x4.25D	698,816	5.7	40,507	0.5
16x4.50D	644,550	5.2	151,403	1.5
16x5.00E	59,614	0.5	7,371	0.1
16x5.50E	14,201	0.1	3,166	0.0
16x6.00E	49	0.0	621	0.0
(1934)				
15x5.50F	756	0.0	.....	...
16x3.25D	44	0.0	.....	...
16x4.00E	240,910	1.9	.....	...
16x4.50E	749,015	6.1	232,465	2.7
16x5.00F	116,739	0.9	35,326	0.4
16x5.50F	8,939	0.1	374	0.0
Drop Center (Standard)				
17x3.00D	985,876	8.0	707,174	8.1
17x3.25E	1,097,064	8.9	1,447,529	16.6
17x3.62F	2,153,484	17.5	1,434,505	16.5
17x4.00F	47,137	0.4	248,328	2.9
17x4.19F	11,471	0.1	39,775	0.5
18x2.15B	27,300	0.2	29,325	0.3
18x3.00D	23,662	0.2	786,869	9.0
18x3.25E	102,663	0.8	128,868	1.5
18x3.62F	338	0.0	1,697	0.0
18x4.00F	4,808	0.0	2,445	0.0
18x4.19F	13,005	0.1	20,229	0.2
19x2.15B	12,870	0.1	11,574	0.2
19x2.75D	.....	...	3,442	0.0
19x3.00D	42,516	0.3	57,545	0.7
19x3.25E	2,418	0.0	.....	...
19x3.62F	.....	...	11	0.0
20x3.25E	1,191	0.0	1,856	0.0
21x2.75D	.....	...	484	0.0
21x3.25E	7,372	0.1	22	0.0

Rim Size	12 Mos., 1934 No.	%	12 Mos., 1933 No.	%
Flat Base Balloon				
17x3.25E	.....	...	156	0.0
17x4	1,640	0.0	2,011	0.0
17x4½	283	0.0	50	0.0
17x5	10,468	0.1	12,694	0.1
17x6	2,032	0.0	.....	...
18x3.00D	1,451	0.0	.....	...
18x3.25E	1,459	0.0	938	0.0
18x4	5,220	0.0	4,618	0.1
18x4½	454	0.0	568	0.0
18x5	1,475	0.0	12,807	0.1
19x2.75D	7,931	0.1	7,048	0.1
19x3.00D	4,480	0.0	2,263	0.0
19x3.25E	39	0.0	2,000	0.0
19x3½	519	0.0	400	0.0
19x4	15,178	0.1	18,773	0.2
19x4½	5,573	0.0	4,021	0.0
19x5	3,510	0.0	3,096	0.0
19x6	176	0.0	105	0.0
20x2.75D	9,654	0.1	14,284	0.2
20x3½	5,609	0.0	2,648	0.0
20x4	2,638	0.0	4,482	0.1
20x4½	7,256	0.1	10,208	0.1
20x5	27,664	0.2	17,386	0.2
20x6	4,043	0.0	.....	...
21x2.75D	345	0.0	3,928	0.0
21x3½	22,635	0.2	9,806	0.1
21x4	2,756	0.0	1,961	0.0
21x4½	7,974	0.1	6,560	0.1
21x5	361	0.0	327	0.0
21x6	521	0.0	338	0.0
High Pressure				
30x3½	3,996	0.0	3,479	0.0
32x4	639	0.0	350	0.0
32x4½	619	0.0	806	0.0
34x4½	208	0.0	418	0.0
18" Truck Rims				
18x5	1,251	0.0	3,012	0.0
18x6	141	0.0	8,154	0.1

Rim Size	12 Mos., 1934 No.	%	12 Mos., 1933 No.	%
18x7	30,029	0.2	.....	...
18x8	2,388	0.0	731	0.0
20" Truck Rims				
20x5	1,958,670	15.9	1,510,096	17.6
20x6	947,465	7.7	339,274	3.9
20x7	207,780	1.7	129,171	1.5
20x8	84,780	0.7	64,646	0.8
20x9/10	11,989	0.1	6,193	0.1
20x10.50	1,140	0.0	491	0.0
20x11	531	0.0	577	0.0
22" Truck Rims				
22x7	3,655	0.0	2,880	0.0
22x8	14,348	0.1	11,633	0.1
22x9/10	6,502	0.1	3,182	0.0
24" Truck Rims				
24x5	257	0.0	644	0.0
24x6	4,236	0.0	4,030	0.0
24x7	14,312	0.1	8,267	0.1
24x8	20,378	0.2	20,443	0.2
24x9/10	10,611	0.1	8,179	0.1
24x11	814	0.0	176	0.0
Drop Center Tractor Rims				
24x6.00S	3,810	0.0	177	0.0
24x8.00T	16,373	0.1	4,934	0.1
28x8.00T	4,496	0.0	1,614	0.0
36x6.00S	11,787	0.1	2,030	0.0
36x8.00T	643	0.0	.....	...
Motorcycle Clincher				
24x3	382	0.0	593	0.0
Automobile Clincher				
30x3½	5,853	0.0	10,179	0.1
Airplane				
18x3D.C.	973	0.0	506	0.0
Totals	12,335,118		8,713,962	

New York Outside Market (Continued)

	January, 1935 21	22	23	24	25	26
No. 1 Ribbed Smoked Sheet	13	12 13/16	12¾	12 13/16	12¾	12 5/8
No. 2 Ribbed Smoked Sheet	12¼	12 1/16	12 1/16	12 5/16	12 5/16	12 5/8
No. 3 Ribbed Smoked Sheet	12 1/16	12	11 7/8	11 15/16	11 7/8	11¾
No. 4 Ribbed Smoked Sheet	11 13/16	11 7/8	11¾	11 13/16	11¾	11 5/8
No. 1 Thin Latex Crepe	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13
No. 1 Thick Latex Crepe	13 1/16	13 1/16	13	13 1/16	13	12 7/8
No. 1 Brown Crepe	11 1/16	11 1/16	10 13/16	11 1/16	11 1/16	10 7/8
No. 2 Brown Crepe	10 13/16	10 13/16	10 11/16	10 13/16	10 7/8	10 5/8
No. 2 Amber	11¼	11 1/16	11	11 1/16	11 1/16	10 13/16
No. 3 Amber	11	10 7/8	10¾	10 7/8	10 13/16	10 11/16
No. 4 Amber	10 5/8	10 7/16	10 7/16	10½	10½	10 3/8
Rolled Brown	10¼	10¼	10 1/8	10 3/16	10 3/16	10

Low and High New York Spot Prices

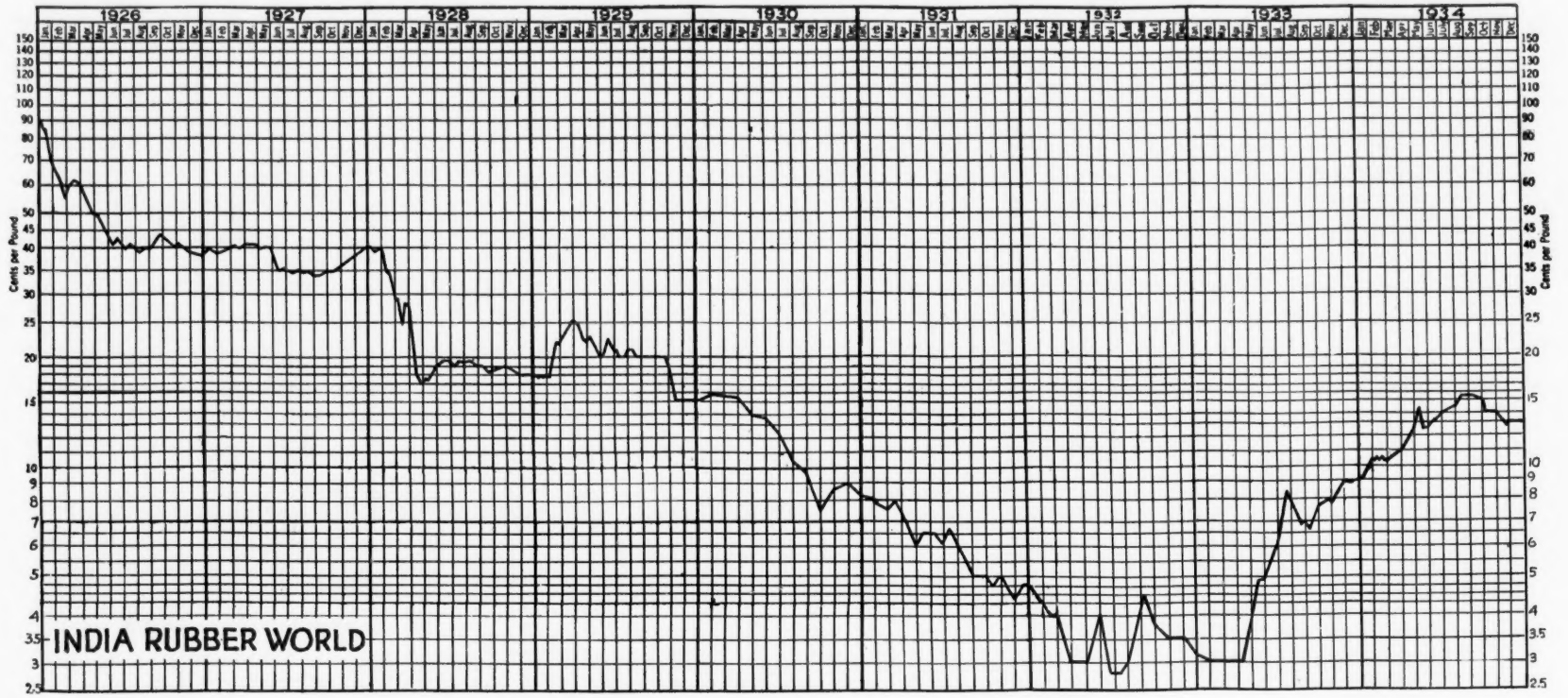
All prices in cents per pound.

	January 1935*	1934	1933
PLANTATIONS			
No. 1 thin latex crepe	13 /14 1/16	10¼/11¾	3 5/8/3 7/8
No. 1 ribbed smoked sheet	12 5/8/13 1/16	8¾/10 3/8	2 1/8/3 1/4
PARAS			
Upriver fine	9¼/ 9¾	8¾/ 9	6 /6¼

*Figured to January 26, 1935.

New York Outside Market—Low and High Spot Rubber Prices in Cents per Pound—1928-1934

		January	February	March	April	May	June	July	August	September	October	November	December
1928,	First latex crepe	38¾/41¼	28½/38¼	24¼/29¼	17 /27¾	17½/20¾	19 /20	19 /20	19¼/20½	18½/19½	19 /20¼	18⅝/19¾	18⅜/19
	Ribbed smoked sheet	38⅝/41¼	28½/38	24 /29⅛	16¾/27½	17⅜/20¼	19¼/19⅞	18¾/19⅞	18¾/20	17¾/19	18¼/19⅛	17⅝/18⅞	17⅝/18¼
	Upriver fine	29¼/33½	24 /29	21¾/25¼	16¾/24	18¾/21	20 /23½	21½/23	20½/23	18¾/21	19 /21½	19¼/20½	19¼/20
1929,	First latex crepe	18¼/22⅜	22 /27¾	22¼/26½	20 /23¼	20⅛/24⅛	21⅛/22⅛	21¾/23⅛	20⅜/22⅝	20⅝/21⅜	19¼/21⅜	16½/19⅛	16¼/17¾
	Ribbed smoked sheet	18 /22⅜	21¾/26⅜	21⅜/26⅛	19½/23	19½/23⅜	20 /21½	20⅝/22½	19⅞/21⅜	19⅝/20½	18¾/20⅜	15¾/18⅛	15½/16½
	Upriver fine	19½/23¾	23½/27¼	23 /27	20½/23½	21¼/24¼	21¾/23½	21¾/22½	21¼/22½	19¾/21¾	19½/20½	16½/19¼	15¾/16½
1930,	No. 1 Thin latex crepe	15 /16⅜	15⅜/16⅞	15⅜/16¼	14⅜/15⅞	14⅛/14¾	12⅛/14¼	10⅞/12¾	10¾/10⅞	7¾/10½	7⅝/ 9¾	8⅝/ 9¾	8¾/ 9⅞
	Ribbed smoked sheet	14⅜/15¾	15 /16⅜	14⅞/15¾	14⅛/15½	13¾/14½	11¾/13¾	10⅜/12¼	9¾/10⅜	7½/ 9¾	7⅜/ 9	8¼/ 9½	8¼/ 9¾
	Upriver fine	15¾/16⅜	16¼/17	16¾/....	15¾/16¼	15½/15¾	14¼/15¼	13¼/14½	13¼/....	12¼/13¼	12¼/....	12¼/12½	12¼/....
1931,	No. 1 Thin latex crepe	8¼/ 8⅞	7½/ 8¼	7⅛/ 8⅜	6 / 7⅛	6¼/ 7⅛	6⅜/ 7⅛	6¼/ 7½	5½/ 6¼	4⅞/ 5¾	4⅞/ 5⅛	4⅝/ 5⅜	4⅝/ 5⅛
	Ribbed smoked sheet	7⅞/ 8½	7¼/ 8	6⅜/ 8⅛	5⅞/ 6⅞	6 / 6⅞	6¼/ 7	5¾/ 6¾	5⅛/ 5¾	4⅞/ 5⅜	4½/ 5⅛	4⅜/ 5	4⅛/ 5⅛
	Upriver fine	.....	9¼/....	9 / 9⅜	8¼/ 9	8¼/ 8⅝	8⅛/ 8¾	8¼/ 8¾	7⅛/ 8⅝	6 / 7¼	6 /....	5¾/ 6¼	5½/ 5¾
1932,	No. 1 Thin latex crepe	4¾/ 5⅛	4⅞/ 4⅞	4⅛/ 4⅝	3⅛/ 4¼	3⅛/ 5	3⅛/ 3⅛	3⅛/ 4	4 / 5⅛	4 / 5⅛	3⅞/ 4¼	3⅞/ 4⅛	3⅛/ 3⅛
	Ribbed smoked sheet	4¼/ 4¾	3⅞/ 4⅛	3 / 3⅝	2⅛/ 3⅝	2¾/ 4⅛	2⅝/ 2¾	2⅝/ 3⅛	3⅛/ 4½	3⅛/ 4⅛	3⅛/ 3⅛	3⅛/ 3⅜	3⅛/ 3⅜
	Upriver fine	5⅛/ 5¾	5¼/ 5⅝	5 / 5¼	5 / 5¼	5½/ 5¾	5½/....	5½/ 5¾	5¾/ 7½	6½/ 7¾	7¼/ 7¾	7¼/ 7½	6½/ 7½
1933,	No. 1 Thin latex crepe	3⅝/ 3⅞	3⅜/ 3⅛	3⅝/ 3⅞	3¾/ 5	5⅛/ 6⅞	5⅞/ 7⅛	7⅜/10½	7½/ 8¾	7½/ 9⅛	7¾/ 8⅞	8½/10⅛	9⅞/10½
	Ribbed smoked sheet	2⅛/ 3¼	2⅞/ 3	2⅛/ 3⅛	2⅛/ 4½	4⅛/ 6½	5¼/ 6⅛	6½/ 9¾	6¾/ 7⅞	6⅝/ 8¼	6⅞/ 8	7¾/ 9⅛	8½/ 9⅛
	Upriver fine	6 / 6¼	6 /....	6 /....	6 / 6½	6¼/ 8¾	7⅛/ 8½	8¼/11	9¾/11	8¾/ 9¾	8 / 9¼	8 / 9	9 /....
1934,	No. 1 Thin latex crepe	10¼/11¾	11¼/12¼	11⅞/13¼	13⅜/15¾	14 /17⅛	14¾/16	15⅞/16⅝	16¼/17⅛	15¾/16¾	13¾/15½	13⅜/14¼	13¼/13⅞
	No. 1 Ribbed smoked sheet	8¾/10⅜	9⅛/10¾	10⅞/11⅝	11¼/13⅝	12 /15¼	12¾/14⅛	13⅛/14⅞	14⅛/15¾	14¾/15⅞	13 /14½	12⅞/13⅜	12¾/13⅛
	Upriver fine	8¾/ 9	9 / 9¾	9¾/10¼	10¼/11	11 /13¼	11 /12	11¼/12	11½/11¾	10¾/11¾	10 /10¾	9¾/10	9½/ 9¾



New York Outside Market—Closing Prices Ribbed Smoked Sheets—1926-1934

COMPOUNDING INGREDIENTS

CONSUMPTION of rubber compounding ingredients is being maintained at an increasing rate due to enlargement of the need of rubber goods for automotive and industrial purposes. Contracts for materials covering the first half of 1935 were placed at no advance in prices over those of the last half of 1934.

ACCELERATORS AND ANTIOXIDANTS. These and other distinctively rubber chemicals are actively moving into consumption, particularly for tires, tubes, high quality mechanicals, and sundries.

CARBON BLACK. The market situation on carbon black is very steady. Production in 1934 increased substantially over 1933, but shipments to consumers were practically identical with production despite the very considerable amount of speculative purchasing by consumers in the Fall of 1933 in anticipation of a price increase on January 1, 1934. It is apparent from this that the total world consumption of carbon black is increasing materially.

Practically all carbon black is now sold on a delivered basis. The approximate equivalent of the delivered price f. o. b. Texas is 4¢ per pound. That price seems to be strongly held owing to the balanced condition between supply and demand, reenforced by the uncertainty of the industry as to what the Texas Legislature will do about taxes and gas conservation. Export prices were fractionally reduced about the first of December, 1934, to reflect economies in handling and shipping, with the result that current export prices are closely equivalent to the domestic basis of 4¢ per pound in sacks, after adding the necessary cost for export packaging and freight.

The outlook for the near future appears good because of activity in automobile manufacture and increased volume of rubber tire production. The more distant future is so dependent on the economic prosperity of the United States and, to a lesser degree, of the world that it is impossible to make a sound guess. Expert opinion, however, is optimistic over this future outlook.

CLAY. Dixie Junior is announced. It is from another deposit of "rubber clay" in the original Dixie mine. It is white and produces a high modulus rubber mix. Its rate of cure is the same as that of the original Dixie.

FACTICE. Steady advance in corn and soya bean oils caused rubber substitutes made from these materials to advance correspondingly. Rubber substitutes made from rapeseed oil hold firm in price.

MINERAL RUBBER. Demand for mineral rubber is active at the present advance in price of this hydrocarbon over 1934 and typical of consumers economizing on crude rubber, especially in competitive goods.

SOLVENTS. The demand is good for petroleum solvents on the part of tire manufacturers. Prices the past month held steady and unchanged.

TITANIUM PIGMENTS. Prices are firm, and consuming demand very active. Plant expansions are in progress to bring production in line with consumption.

ZINC OXIDE. Producers are selling and contracting zinc oxide for the first half of 1935 at the same price as prevailed for the last 9 months of 1934. The indications are that zinc oxide consumption for 1934 will show a substantial gain over that of 1933. The excellent trade prospects of the first half of 1935 for the zinc oxide consuming industries point to a steady consumption of this material during that period.

New York Quotations

January 26, 1935

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered	lb.	$0.01¼/$0.03½
Rottenstone, domestic	lb.	.02½/ .05
English	ton	
Silica, 15	ton	
Tripoli	lb.	.02¼/ .03

Accelerators, Inorganic

Lead, white, dry (bbls.)	lb.	.06½
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.06 / .06¼
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½

Accelerators, Organic

A-1	lb.	.21 / .25
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	
Accelerator 49	lb.	.40 / .51
87	lb.	
122	lb.	
552	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.44 / .56
D.O.T.T.U.	lb.	
DPG	lb.	.35 / .46
Esterex	lb.	
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	$0.10
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
Pipsolene	lb.	
R-2	lb.	1.55 /$1.90
Base	lb.	4.55 / 5.00
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tepidone	lb.	
Tetrone A	lb.	
Thio	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	.62 / 1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	.48 / .60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	

Acids

Acetic 28% (bbls.)	100 lbs.	2.40 / 2.65
glacial (carboys)	100 lbs.	14.00
Sulphuric, 66°	ton	15.50

Activator

Barak	lb.	

Age Resisters

Age-Rite Gel	lb.	
HP	lb.	
powder	lb.	
resin	lb.	
white	lb.	
Akroflex A	lb.	
B	lb.	
C	lb.	
Albasan	lb.	
Antox	lb.	
A-V-A-R	lb.	
B-L-E	lb.	
Flectol A	lb.	
B	lb.	
H	lb.	
White	lb.	
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	
Parazone	lb.	
Permalux	lb.	
Solux	lb.	
V-G-B	lb.	

Alkalies

Caustic soda, 50% liquid, Columbia	100 lbs.	$2.25
solid	100 lbs.	2.50 /$3.50

Antiscorch Materials

Antiscorch T	lb.	
Retarder B	lb.	
W	lb.	
R. H. Cumar	lb.	.085
U-T-B	lb.	

Antisun Materials

Heliozone	lb.	
Sunproof	lb.	

Binders, Fibrous

Asbestos	ton	30.00

Brake Lining Saturants

B. R. C. No. 553	lb.	.015 / .017
B. R. T. No. 3	lb.	.015 / .017

Colors

BLACK

Bone (Quality Group No. 1)	lb.	.11½/ .12
Lampblack (commercial)	lb.	.07 / .15

BLUE

Brilliant	lb.	
Prussian	lb.	$0.36½
Toners	lb.	.80 /$3.50
Ultramarine, dry	lb.	.10

BROWN

Mapico	lb.	.13
Sienna, Italian, raw (Quality Group No. 1)	lb.	.12½

GREEN

Brilliant	lb.	
Chrome, light	lb.	.20
medium	lb.	.20
oxide (delivered)	lb.	.21½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50

ORANGE

Lake	lb.	
Toners	lb.	.40 / 1.60

ORCHID

Toners	lb.	1.50 / 2.00

PINK

Toners	lb.	1.50 / 4.00

PURPLE

Permanent	lb.	
Toners	lb.	.60 / 2.00

RED

Antimony		
Crimson, R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48 / .60
Golden 15/17%	lb.	.26 / .30
7-A	lb.	.33
Z-2	lb.	.20
Cadmium	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Iron Oxides		
Rub-Er-Red	lb.	.09¼
Mapico	lb.	.09¼
Medium	lb.	
Scarlet	lb.	
Toners	lb.	.80 / 2.00

WHITE

Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label-11	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½/ .04¾
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
Sunolith (5-ton lots)	lb.	.04½/ .04¾
XX-20 Zinc Sulphide	lb.	.10½/ .10¾
86	lb.	.10½/ .10¾
Rayox	lb.	
Titanolith (5-ton lots)	lb.	.06 / .06¼
Titanox-A	lb.	.17 / .18¾
B	lb.	.06 / .06½
C	lb.	.06 / .06½
Ti-Tone	lb.	
Zinc Oxide		
Azo 35 (35% leaded)	lb.	.05¾/ .06
Z (10% leaded)	lb.	.06¼/ .06½
ZZ (3-5% leaded)	lb.	.06¼/ .06½
ZZZ (lead free)	lb.	.06½/ .06¾
Ceramatone	lb.	.06½/ .06¾
F. P. Florence, Green Seal-8	lb.	.09⅜/ .09⅝
Red Seal-9	lb.	.08⅜/ .08⅝
White Seal-7 (bbls.)	lb.	.10⅝
Green Seal, Anaconda	lb.	.09⅜/ .09⅝
Horsehead (lead free) brand		
Special-3	lb.	.06½/ .06¾
XX Red-4	lb.	.06½/ .06¾
72	lb.	.06½/ .06¾
78	lb.	.06½/ .06¾
103	lb.	.06½/ .06¾
Kadox Black Label-15	lb.	.09⅜/ .09⅝
Blue Label-16	lb.	.08⅜/ .08⅝
Red Label-17	lb.	.07 / .07¼
Lead free, all grades, Anaconda	lb.	.06½/ .06¾
Leaded, 5%, Anaconda	lb.	.06¼/ .06½
35%, Anaconda	lb.	.05¾/ .06
Red Seal, Anaconda	lb.	.08⅜/ .08⅝
St. Joe (lead free)		
Black Label	lb.	.06½
Green Label	lb.	.06½
Red Label	lb.	.06½
U.S.P. (bbls.)	lb.	.12¾
U.S.P. X (bbls.)	lb.	.12½
White seal, Anaconda	lb.	.10⅝

YELLOW

Cadmium	lb.	.40 / .45
Lemon	lb.	
Mapico	lb.	.09½
Ocher, domestic (Quality Group A)	lb.	.02¾
Toners	lb.	2.50

Dispersing Agents

Bardex	lb.	.023 / .025
Bardol	lb.	.021 / .023
Darvan	lb.	
Sperzo	lb.	

Factice—See Rubber Substitutes

Fillers, Inert

Asbestine, c.l., f.o.b. mills	ton	15.00
Barytes, New York	ton	20.00
f.o.b. St. Louis	ton	23.00
off color, domestic	ton	$22.50 /$25.00
white, imported	ton	32.50 /35.00
Blanc fixe, dry precip.	ton	70.00 /75.00
pulp	ton	42.50
Calcene	ton	35.00 /43.00
Infusorial earth	lb.	.03 / .05
Kalite No. 1	ton	
No. 3	ton	
Suprex, white, extra light	ton	
heavy	ton	45.00 /60.00
Whiting		
Chalk precipitated	lb.	.04¾/ .04¾
Columbia brand	ton	9.00 /14.00
Domestic	100 lbs.	
Hakuenka	lb.	
Paris white, English cliff-stone	100 lbs.	
Southwark Brand, Commercial	100 lbs.	
All other grades	100 lbs.	
Sussex	ton	
Witco	ton	15.00
Wood flour (f.o.b. New Hampshire)	ton	

Fillers for Pliability

Flex	lb.	
Fumonex, c.l., f.o.b works, bags	lb.	.03
l.c.l., f.o.b. warehouse	lb.	.05½/ .07
P-33	lb.	
Thermax	lb.	
Velvetex	lb.	

Finishes

IVCO lacquer, clear	gal.	
colors	gal.	
Rubber lacquer, clear	gal.	
colored	gal.	
No. 106	gal.	3.00
Starch, corn, pwd.	100 lbs.	3.56 / 3.76
potato	lb.	.05¼/ .06
Talc, dusting	ton	20.00
Pyrax	ton	

Flock

Cotton flock, dark	lb.	.10½/ .13
dyed	lb.	.50 / .85
white	lb.	.14 / .20
Rayon flock, colored	lb.	1.60 / 1.75
white	lb.	1.40

Latex Compounding Ingredients

Antox, dispersed	lb.	
Aquarex D	lb.	
F	lb.	
Aresco	lb.	.28 / .40
Aresklene	lb.	
Casein, domestic (5-ton lots, delivered)	lb.	.11½/ .12
Catalpo	ton	
Color pastes, d spersed	lb.	
Dispersaid	lb.	1.50
Emo, brown	lb.	.12
white	lb.	.12
Factice Compound, dispersed	lb.	.36
Heliozone, dispersed	lb.	
Igepon A	lb.	
Nekal BX (dry)	lb.	
Palmol	lb.	.09
Sulphur, colloidal	lb.	
Vulcan colors	lb.	
Zinc oxide, colloidal	lb.	

Mineral Rubber

B. R. C. No. 20	lb.	.0125/ .014
Black Diamond	ton	27.00
Genasco Hydrocarbon, granulated, (fact'y)	ton	30.00
solid	ton	25.00
Gilsonite Hydrocarbon (factory)	ton	
Hydrocarbon, hard	ton	
soft	ton	
Parmr Grade 1	ton	25.00 /28.00
Grade 2	ton	25.00 /28.00
265°	ton	

Mold Lubricants

Mold Paste No. 1	lb.	
Rusco mold paste	lb.	.12 / .30
Sericite	ton	65.00 /70.00
Soapbark (cut)	lb.	.11 / .12
Soapstone	ton	15.00 /25.00

Oils

Castor, blown, c.l., drums, returnable	lb.	.11½
Cottonseed oil fatty acids	lb.	.0690/ .0740
Poppyseed (bbls.)	gal.	
Rapeseed, refined (bbls.)	gal.	.46 / .47

Reclaiming Oils

B. R. V.	lb.	.039 / .041
S. R. O.	lb.	.012 / .014

Reenforcers

Carbon Black		
Aerfloted Arrow Specification Black	lb.	.0535/ .0825
Arrow Compact Black	lb.	
Granulized Carbon Black	lb.	
Century (delivered)	lb.	.0445/ .0535
"Certified" Cabot	lb.	
Spheron	lb.	
Disperso (delivered)	lb.	$0.0445/$0.0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
local stock, delivered	lb.	.07 / .08¼
Excello, c.l., f.o.b. Gulf ports	lb.	.0445
delivered New York	lb.	.0535
l.c.l., delivered New York	lb.	.07 / .08¼
Gastex	lb.	.03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
local stock, delivered	lb.	.07 / .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
local stock, delivered	lb.	.07 / .08¼
Micronex	lb.	.0535
Beads	lb.	
Ordinary (compressed or uncompressed)	lb.	.0535
Supreme, c.l., f.o.b Gulf ports	lb.	.0445
delivered New York	lb.	.0535
l.c.l., delivered New York	lb.	.07 / .08¼
Carbonex	lb.	.030 / .0375
Carbonex "S"	lb.	.0315/ .040
Clays		
Aerfloted Paragon	ton	7.50 /10.00
Suprex, No. 1, selected	ton	10.00
No. 2, standard	ton	7.50
Blue Ridge, dark	ton	
China	ton	
Dixie	ton	
Junior	ton	
McNamee	ton	
Par	ton	
Perfection	ton	
Standard	ton	
Witco	ton	8.50 / 9.00
Cumar EX	lb.	.04

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Para-Dors	lb.	
Rodo No. 0	lb.	
No. 10	lb.	

Rubber Substitutes or Factice

Amberex	lb.	.13¾
Black	lb.	.06½/ .09
Brown	lb.	.08 / .11
Duphax A	lb.	.095
B	lb.	.095
Fac-Cel B	lb.	.12
C	lb.	.12
White	lb.	.08½/ .12

Softeners

B. R. C. No. 555	lb.	.012 / .014
B. R. T. No. 7	lb.	.015 / .017
Burgundy pitch	lb.	.04 / .05
(net weight)	lb.	.07 / .08½
Corn oil, crude (bbls.)	lb.	.09
Cycline oil	gal.	.15 / .28
Fluxol	ton	
Genasco liquid asphalt	gal.	.07
Hardwood pitch, c.l.	ton	23.50 /25.00
Palm oil	lb.	.08 / .08½
(Witco)	lb.	.05
Petrolatum, light amber	lb.	.03¾
Pigmentar (drums)	gal.	.25 / .27
Pigmentaroil (drums)	gal.	.25 / .27
Pine oil, dest. distilled (drums)	gal.	.44 / .48
pitch	bbl.	6.00
tar (drums)	gal.	.25 / .27
retort	gal.	.33
Plastogen	lb.	
Reogen	lb.	
Rosin oil, compounded	gal.	.37 / .41
Rubtack	lb.	.10
Seedine	lb.	.06¾/ .07¼
Tackol	lb.	.085 / .18
Tonox	lb.	
Powder	lb.	
Witco No. 20	gal.	.15
Woburn No. 8 oil	lb.	.05½/ .06

Softeners for Hard Rubber Compounding

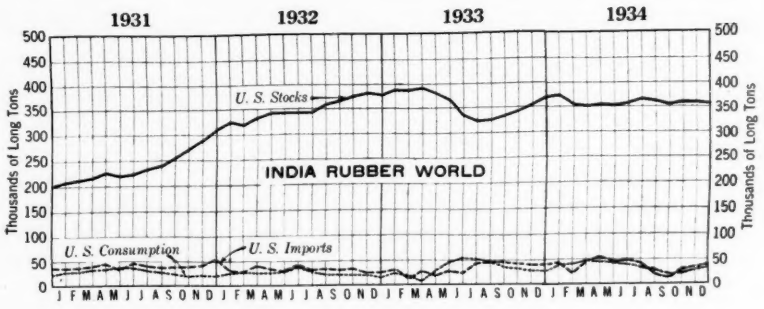
RSL Resin	lb.	
Resin C-55°	lb.	.0125/ .0145
Resin C-70°	lb.	.0125/ .0145
Resin C-85°	lb.	.0125/ .0145

Solvents

Benzol 90% (drums)	gal.	.25
Bondogen	gal.	
Carbon bisulphide (drums)	lb.	.05¼/ .08½
tetrachloride	lb.	.05¼
Dipentene, commercial (drums)	gal.	.42 / .44
Rubber (f.o.b. Group 3 refineries)	gal.	
Solvesso No. 1, tank cars	gal.	.17½
No. 2	gal.	.22½
No. 3	gal.	.17½
No. 4	gal.	.22½
Toluol	gal.	.38

(Continued on page 75)

IMPORTS, CONSUMPTION, AND STOCKS



United States Stocks, Imports, and Consumption

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat† Tons	United Kingdom Stocks†‡ Tons	Singapore and Penang, Etc., Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1931	495,163	348,986	322,825	40,455	127,103	55,458	797,441	668,660	495,724
1932	400,787	332,000	379,000	38,360	92,567	36,802	709,840	670,250	518,187
1933	411,615	401,000	365,000	55,606	86,438	48,744	845,291	818,370	489,029
1934									
January ...	46,204	39,284	368,660	45,768	90,272	51,427	81,487	77,200	510,359
February ..	31,032	40,609	357,094	53,063	92,482	52,580	88,239	82,100	502,155
March	44,605	47,097	353,242	54,722	94,314	59,224	92,070	78,000	506,494
April	45,662	44,947	351,981	56,251	96,108	63,381	84,153	88,400	508,795
May	47,954	43,012	351,329	57,921	96,197	89,758	115,612	79,300	537,278
June	49,683	40,241	358,149	46,698	99,702	82,333	70,250	75,000	542,958
July	41,530	32,647	364,883	45,869	105,904	76,417	73,279	69,100	547,204
August	33,248	33,310	362,647	40,278	105,199	77,100	75,093	79,500	544,944
September .	28,835	30,352	359,667	38,831	112,951	69,824	88,894	81,200	542,340
October	35,298	31,347	362,018	38,247	120,897	69,587	68,938	68,800	552,502
November .	36,233	34,842	361,236	38,625	127,762	62,966	76,592	75,400	551,964
December ..	29,200	36,662	352,632	47,644	.....	.....	.....	.....	.....

*Including liquid latex, but not guayule. †Stocks on hand the last of the month or year. ‡W. H. Rickinson & Son's figures. §Stocks at the 3 main centers, U. S. A., U. K., Singapore and Penang.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for December, 1934:

Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

To	December, 1934 Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	12,637	98
United States	29,194	370
Continent of Europe..	11,532	605
British possessions	1,506	70
Japan	2,853	14
Other countries	689	7
Totals	58,411	1,164

Rubber Imports: Actual, by Land and Sea

From	December, 1934 Dry Rubber Tons	Wet Rubber Tons
Sumatra	2,073	5,364
Dutch Borneo	1,745	1,041
Java and other Dutch islands.	449	20
Sarawak	1,226	11
British Borneo	451	16
Burma	540	10
Siam	1,408	635
French Indo-China	188	64
Other countries	120	14
Totals	8,200	7,175

New York Quotations

(*Continued from page 72*)

Solvents (*continued*)		
Turpentine, steam distilled	*gal.*	$0.52
wood, dest. distilled (drums)	*gal.*	.41 /$0.43
Stabilizers for Cure		
Cocoanut oil F. A. (Lauric Acid)	*lb.*	.09½/ .10¼
Laurex, ton lots	*lb.*	
Stearex B	*lb.*	.09½/ .10
Beads	*lb.*	.08 / .09
Stearic acid, dbl. pres'd....	*lb.*	.12 / .14
single pressed	*lb.*	.10 / .12
Zinc stearate	*lb.*	.20 / .25
Synthetic Rubber		
DuPrene Latex Type 50..	*gal.*	
Type D	*lb.*	
Tackifier		
B. R. H. No. 2.....	*lb.*	.015 / .017
Varnish		
Shoe	*gal.*	1.50
Vulcanizing Ingredients		
Sulphur		
Chloride, drums	*lb.*	.03½/ .04
Flowers, extrafine refined, U.S.P. ...100	*lbs.*	
Rubber 100	*lbs.*	1.95 / 2.70
Telloy	*lb.*	
Vandex	*lb.*	
(See also Colors—Antimony)		
Waxes		
Carnauba, No. 3 chalky....	*lb.*	.22 / .23
2 N.C.	*lb.*	
3 N.C.	*lb.*	.23 / .24
1 Yellow	*lb.*	.37 / .38
2	*lb.*	.36 / .37
Montan, crude	*lb.*	.10¾/ .10¾
Paraffine (128/130) refined.	*lb.*	.06½

CRUDE rubber consumption by United States manufacturers for December, 1934, amounted to 36,662 long tons, compared with 34,842 long tons for November, an increase of 5.2% over November and 27.5% over December, 1933, according to R. M. A. statistics. Consumption for December, 1933, was 28,757 (revised) long tons. Consumption of crude rubber during 1934 totaled 454,350 long tons, against 401,000 long tons in 1933 and 332,000 long tons in 1932. 1934 consumption is the highest consumption for any one year with the exception of 1929 when consumption was 467,400 long tons.

Crude rubber imports for December were 29,200 long tons, 19.4% below the November figure of 36,233 long tons and 30.6% below 42,099 long tons imported in December, 1933. Imports of crude rubber during 1934 amounted to 469,484 long tons, compared with 411,615 long tons in 1933 and 400,787 long tons in 1932.

The estimated total domestic stocks of crude rubber on hand December 31 were 352,632 long tons, against November 30 stocks of 361,236 long tons and 365,000 long tons on hand December 31, 1933.

Crude rubber afloat for United States ports on December 31, 1934 was 47,644 long tons, compared with 38,625 long tons afloat on November 30, 1934 and 55,606 long tons on December 31, 1933.

London and Liverpool Stocks

Week Ended	Tons London	Liverpool
Dec. 29.....	72,314	62,617
Jan. 5.....	73,407	63,132
Jan. 12.....	75,821	65,099
Jan. 19.....	78,138	65,977
Jan. 26.....	79,530	65,768

NEW GOODS

Oilproof Rubber Cement

THIOKOL CORP., Yardville, N. J., has developed a new line of products designated as "Thiokol" C cements. These are rubber-like cements which, on evaporation of the solvent, leave elastic films that are oilproof and unaffected by most all ordinary solvents and are highly resistant to moisture, sunlight, oxidation, and ozone.

"Anode" Trusses

PURE latex rubber is deposited by the "Anode" process on metal truss springs to produce a durable, sanitary, comfortable, smooth, and pliable rubber coating. The smooth surface with no protruding stud-posts to wear the clothing assures comfort in a riding or a sitting position. The sponge rubber pads are another important feature of these trusses, which are also waterproof. The Akron Truss Co., 283 S. Main St., Akron, O.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Dec. 1	Dec. 29	Jan. 5, 1935	Jan. 12	Jan. 19	Jan. 26
Dec. ..	12.46	....	....	....	....	....
Jan. ..	12.52	12.71	12.46	12.38	12.36	....
Feb. ..	12.55	12.59	12.51	12.41	12.40	12.40
Mar. ..	12.60	12.64	12.57	12.45	12.45	12.46
May ..	12.60	12.74	12.65	12.53	12.52	12.51
July ..	12.53	12.79	12.69	12.53	12.54	12.51
Sept. ..	12.33	12.75	12.59	12.42	12.47	12.45
Oct. ..	12.25	12.69	12.57	12.37	12.44	12.43
Nov. ..	....	12.64	12.59	12.40	12.47	12.45
Dec. ..	....	12.67	12.62	12.43	12.51	12.49

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of this review. This plan permits tracing at a glance the prices of each future for approximately 2 consecutive months.

Week ended December 29, 1934. The period began with liquidation of January positions ruling the activity and reducing prices. After the Christmas holiday the Wednesday market was slow and weak; causes resided in the fact that few traders had returned from their holidays, and reports that the Government had reduced its pool holdings by about 200,000 bales and practically eliminated its holdings of long futures. A strong mill and foreign demand appeared which changed the early-week trend with rallies that closed the period at the highest point for the past 3 months and 5 to 7 points over the previous week's close.

Week ended January 5, 1935. Bombay, Japan, Liverpool, and Continental buying strengthened trading and prices December 31, which was a single trading day sandwiched between 2 holidays. Prices varied but slightly until the last day because of unseasonably strong foreign demand. In previous years export demand came principally before the year's close. Indications now seem to point to a reversal of this habit since the new year export demand has increased beyond that shown in 1934. The high position of the week was lost in Saturday's decline, which closed 7 to 14 points below the previous week. Long liquidation, foreign speculative selling, and the resulting stop-loss selling drove prices down 11 to 13 points for the day. Inflation rumors and encouraging export prospects provided stabilizing influences that stopped the down trend.

Week ended January 12. The market appeared to be technically improved by the speculative liquidation of Saturday's session as indicated by its 5 to 9 point recovery Monday merely on the strength of inflationary possibilities. Easing prices marked trading during the remainder of the period, however, because of fear of a market break if the Supreme Court should not decide the gold cases in the Government's favor. The week ended with a decline of 8 to 20 points below the previous week's close.

Week ended January 19. This period ended 2 points lower to 8 points higher than the previous week, new crop months being favored in the transactions. Sharp declines developed early in the period because of the upset condition of foreign exchange resulting from the pending gold cases; but later prices recovered as confidence was somewhat restored by the long delay of the decision, February 4, and the rumors that offsetting legislation would prevent chaotic monetary disturbances if the cases were decided against the Administration policy. Rumors in advance of official announcements had 10,500,000 bales as the Bankhead 1935 crop allotment figure. As this figure was lower than anticipated, prices were raised to highs of the week Thursday, but tumbled again when it was learned that these were gross, not net, weight bales; moreover, the figure did not include 700,000 bales represented by carried over tax exemption certificates. Washington is considering a 35% instead of a 25% cut in contract acreage by paying an additional $130,000,000 benefit to the growers, also the possibility of eliminating the loan plan on the 1935 crop. Such rumors of both bullish and bearish tone closed the period with an air of uncertainty.

Week ended January 26. Early dealings at the opening on Monday brought a break of $1 per bale. This was soon recovered, though, on news that the Indian crop would be 350,000 to 400,000 bales less than expected because of frost in the northern regions and drought in the southern regions, and also with active trade demand. The day closed with net increases of 4 to 14 points. An idea of the concern felt in cotton circles regarding the Supreme Court's possible action in the gold cases is evidenced by the New York Cotton Exchange board of managers' decision that the Exchange would not close in event that the decision would not uphold the Government interest. This subject prevented the market from the normal influence of such favorable reports as unusual activity of Japanese mills and doubling the earlier estimates of Indian crop shortage. Fluctuations were within a narrow range. Trading was very light. The period closed 0 point to 3 points below the previous week's closing prices.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The market was quite active on fabrics up to the middle of January, then eased off considerably, but renewal of demand was presently expected. Goods of "special" construction are not to be had readily for immediate shipment. More and more buyers will of necessity have recourse to contracts for future production in order to keep themselves supplied in constructions of the commoner standards.

Prices are a little firmer than a month or 2 ago, and the market is holding its gains. Prospects are good for prices to levels substantially higher than the present range because of the firmer material market as well as the improved call for merchandise.

The market is liable to turn out difficult for those needing quick shipment of special constructions. The question

(*Continued on page 78*)

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Dec. 29	12.80
Jan. 5	12.83
Jan. 12	12.79
Jan. 19	12.63
Jan. 26	12.66

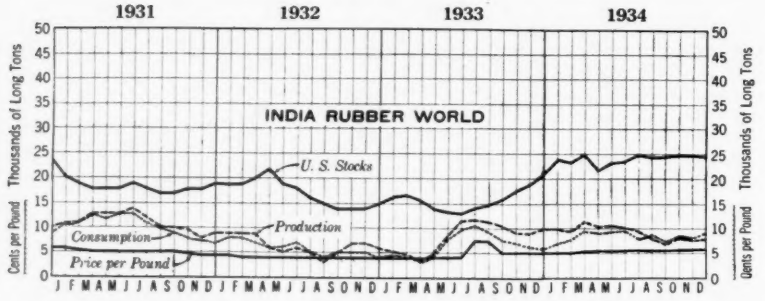
New York Quotations

January 26, 1935

Drills		
38-inch 2.00-yard	yd.	$0.16
40-inch 3.47-yard		.09⅜
50-inch 1.52-yard		.21¼
52-inch 1.85-yard		.17¾
Ducks		
38-inch 2.00-yard D. F.	yd.	.16
40-inch 1.45-yard S. F.		.22¼
72-inch 1.05-yard D. F.		.31⅜
72-inch 17.21-ounce		.35½
MECHANICALS		
Hose and belting	lb.	.34
TENNIS		
52-inch 1.35-yard	yd.	.23¾
***Hollands**		
GOLD SEAL		
30-inch No. 72	yd.	.19½
40-inch No. 72		.20½
RED SEAL		
30-inch	yd.	.17
40-inch		.18½
50-inch		.23½
Osnaburgs		
40-inch 2.34-yard	yd.	.13½
40-inch 3.00-yard		.10⅜
40-inch 10-ounce part waste		.15
37-inch 2.42-yard		.13¼
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	yd.	.09¾
Plaids 60 x 48		.11⅜
Surface prints 60 x 64		.12⅜
Print cloth, 38½-inch, 60 x 64		.06¾
SHEETINGS, 40-INCH		
48 x 48, 2.50-yard	yd.	.11¼
64 x 68, 3.15-yard		.10¼
56 x 60, 3.60-yard		.08⅝
44 x 48, 3.75-yard		.07¼
SHEETINGS, 36-INCH		
48 x 48, 5.00-yard	yd.	.06¼
44 x 40, 6.15-yard		.05¼
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.39
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	lb.	.39
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.39
CORD FABRICS		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.39
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.37
23/5/3 Karded peeler, 1¼" cotton	lb.	.46
23/5/3 Combed Egyptian	lb.	.53
LENO BREAKER		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.34

*For less than 1,000 yards of a width add 10% to given prices.

RECLAIMED RUBBER



Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1931	132,462	125,001	35.7	19,257	6,971
1932	75,656	77,500	23.3	21,714	3,536
1933	99,974	81,612	20.1	20,746	3,583
1934					
January	9,828	7,000	17.3	24,303	333
February	9,504	7,646	18.8	23,356	282
March	11,479	9,683	20.3	25,113	354
April	10,185	9,387	20.9	22,033	394
May	10,848	9,500	22.1	22,887	559
June	10,820	9,459	23.5	23,664	444
July	9,446	8,175	25.0	24,926	669
August	8,160	8,493	25.5	24,607	410
September	6,974	7,024	23.1	24,540	307
October	8,145	8,171	26.1	24,511	356
November	7,268	7,775	22.3	23,999	419
December	7,353	8,284	22.6	23,079	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

RUBBER reclaimers are optimistic over the outlook for good business during the next 6 months because the demand for rubber products by car manufacturers promises to be much larger this spring than last as indicated by buying interest in 1935 cars.

December consumption of reclaim increased considerably over that of the preceding month. Prices, however, remain unchanged for all standard grades. A tendency to price advancement is noted in connection with some grades of rubber scrap. This and the strong position of crude serve to firm reclaim prices. The excellent technical value of reclaims and their economic advantage are well established in rubber working practice and stimulate renewed favor for them on the part of manufacturers as crude prices increase over a reasonably fair ratio.

New York Quotations

January 26, 1935

	Spec. Grav.	Cents per lb.
High Tensile		
Super-reclaim, black	1.20	8¾/9
red	1.20	7 /7¼
Auto Tire		
Black	1.21	5 /5¼
Black selected tires	1.18	5¼/5½
Dark gray	1.35	6¼/6½
White	1.40	9¼/9½
Shoe		
Unwashed	1.60	6½/6¾
Washed	1.50	8 /9
Tube		
No. 1	1.00	13 /
No. 2	1.10	7½/7¾
Truck Tire		
Truck tire, heavy gravity	1.55	5¼/6
Truck tire, light gravity	1.40	6 /6¼
Miscellaneous		
Mechanical blends	1.60	4¼/4½

RUBBER SCRAP

THE market for rubber scrap during January was dull on account of moderate production by reclaimers.

BOOTS AND SHOES. These are in good demand. Supplies are scanty because of winter weather and the poor prices offered to collectors. Prices are up ⅛¢ on black shoe scrap.

INNER TUBES. A very good demand on all grades of tubes is maintained on stock for export.

TIRES. The demand is still moderate, but more activity is anticipated in the spring when automotive rubber products will require considerable tonnages of reclaim.

SOLID TIRES. Both domestic and export demand for solids is well maintained. Supplies, however, continue scanty.

MECHANICALS. The demand dropped back to fair in January, with improvement anticipated in the early spring months with the revival of demand for automobile sundries in the form of mats, running boards, weather stripping, etc.

HARD RUBBER. Prices are very steady by reason of the limited supply which shows no immediate prospect of increase.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

January 26, 1935

	Prices
Boots and Shoes	
Boots and shoes, black....*lb.*	$0.01⅛/$0.01¼
Colored .....*lb.*	.00¾/ .00⅞
Untrimmed arctics .....*lb.*	.00¾/ .00⅞
Inner Tubes	
No. 1, floating.....*lb.*	.07 / .07¼
No. 2, compound.....*lb.*	.03⅛/ .03½
Red .....*lb.*	.02⅜/ .02½
Mixed tubes .....*lb.*	.02¾/ .03
Tires (Akron District)	
Pneumatic Standard	
Mixed auto tires with beads .....*ton*	9.00 / 9.50
Beadless .....*ton*	16.50 /17.00
Auto tire carcass.....*ton*	10.00 /10.50
Black auto peelings.....*ton*	19.00 /20.00
Solid	
Clean mixed truck.....*ton*	38.50 /40.00
Light gravity .....*ton*	42.00 /43.00
Mechanicals	
Mixed black scrap.....*ton*	15.00 /17.00
Hose, air brake .....*ton*	14.00 /15.00
Garden, rubber covered.*ton*	13.00 /13.50
Steam and water, soft...*ton*	13.00 /13.50
No. 1 red.....*lb.*	.01⅞/ .02
No. 2 red.....*lb.*	.01⅛/ .01¼
White druggists' sundries..*lb.*	.02½/ .02¾
Mechanical .....*lb.*	.01¾/ .01½
Hard Rubber	
No. 1 hard rubber.....*lb.*	.11⅛/ .11½

Cotton and Fabrics

(*Continued from page 76*)

of the shipping dates possible as to fabrics will displace gradually that which has been dominant over the last 4 years: namely, "What is the price?"

RAINCOAT FABRICS. Raincoat manufacturers are just starting to show their new spring lines; consequently very little business is being done in raincoat fabrics.

SHEETINGS. There has been very little buying of consequence since mid-December; therefore some prices have declined below the December lows. At this time of year there is considerable buying for spring, and as soon as external conditions become stabilized, buyers will again enter the market.

TIRE FABRICS. Demand is moderate and seasonal; prices are steady and unchanged.

Ohio

(*Continued from page 51*)

has operated on a fairly active scale since November 1, and prospects are encouraging for its continuance, employing 250 workers. Quaker City Rubber Co., Philadelphia, Pa., a third subsidiary, manufacturer of mechanicals, has been running on practically a full-time basis.

Ault & Wiborg, Cincinnati, has appointed a new vice president, Charles R. Sherman, who has had a broad experience in the paint, varnish, and lacquer industry. Mr. Sherman will be in complete charge of all the company's manufacturing operations and will assist in supervising sales policies under President Joseph R. Esposito.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

GOLF BALL PRODUCTION SUPERINTENDENT: YOUNG MAN thoroughly experienced with the manufacture of golf balls, desires position as production superintendent. Address Box No. 455, care of INDIA RUBBER WORLD.

TECHNICALLY TRAINED MAN WITH REAL BACKGROUND OF 20 years' experience in engineering, product construction, product and process control, and general manufacturing experience in tires, tubes, accessories and molded mechanical goods. Accustomed to analyze and correct faulty constructions and manufacturing methods and produce results. Address Box No. 456, care of INDIA RUBBER WORLD.

PRODUCTION AND PRESS ROOM FOREMAN LOOKING FOR A new connection. Noted for excellent ideas and new methods of producing. Experienced in all kinds of molded goods, such as heels, soles, and cement applied soles. Good references. Address Box No. 458, care of INDIA RUBBER WORLD.

CHEMIST, AGE 30, 8 YEARS' EXPERIENCE COMPOUNDING, testing, general technical supervision. Address Box No. 459, care of INDIA RUBBER WORLD.

RUBBER CHEMIST AND COMPOUNDER DESIRES POSITION with progressive company. Four years' experience with mechanicals, tires, latex, sponge, etc. Familiar with latest production methods, costs, and problems. Technically trained. Willing to start at $125 per month. Available on short notice. Best references. Address Box No. 463, care of INDIA RUBBER WORLD.

PROFESSIONAL SERVICES

ENGINEERS • CONSULTANTS • CHEMISTS

ROYCE J. NOBLE, Ph.D.

Chemical Engineer *Latex Processes*

56 WILBUR STREET MALDEN, MASS.

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Rubber Testing Laboratories

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SALES ASSISTANT OR CORRESPONDENT. ALL TYPES INdustrial hose, couplings, etc. Wide contact mechanical rubber, contractor, railway and mill and factory supply jobbers. Capable of developing business for new product, or securing new contacts and increased sales for established line. Also thoroughly capable credit executive. Address Box No. 461, care of INDIA RUBBER WORLD.

SUPERINTENDENT: 18 YEARS' EXPERIENCE MANUFACTURING mechanicals, molded goods, tubes, hard rubber specialties, calender and tube machine products. Good labor manager, now employed, desires change. Address Box No. 466, care of INDIA RUBBER WORLD.

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FOREMAN FOR INSULATED WIRE RUBBER DEPARTMENT, with compounding and tubing experience. Address Diamond Braiding Mills, Chicago Heights, Illinois.

GENERAL MANAGER WANTED

To take complete charge rubber company vicinity Cleveland, Ohio, manufacturing principally for the automotive trade such items as floor mats, matting, fan belts, radiator hose, and miscellaneous molded and extruded parts.

Must have practical and executive experience, be able to handle men, and obtain maximum production. Thorough knowledge compounding necessary. Preference given to applicant able to make investment to insure permanency.

Give complete details of experience, companies worked for, and probable investment in first letter. Address Box No. 462, care of India Rubber World.

WANTED: MAN EXPERIENCED IN COMPOUNDING, MIXING, sponging rubber. Must have had at least 10 years' experience. No others need apply. Address Box No. 467, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST. MUST HAVE HAD AT LEAST 10 years' experience. Address Box No. 468, care of INDIA RUBBER WORLD.

WANTED BY CANADIAN FIRM, PRACTICAL RUBBER CHEMIST who has experience in rubber covered wire manufacturing. Must be familiar with tubing and strip process of insulation. State experience, reference, and salary expected. Mail replies direct to D. Horsfall, Works Manager, Canada Wire & Cable Co., Ltd., Box 518, Toronto, Canada.

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(*Advertisements continued on page* 81)

U. S. Crude and Waste Rubber Imports for 1934

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1934	Totals 1933	Balata	Miscellaneous	Waste
Jan. .....*tons*	44,988	973	182	61	..	..	..	46,204	31,110	73	693	32
Feb.	30,164	750	118	..	..	..	..	31,032	18,875	70	607	..
Mar.	43,204	901	450	..	..	50	..	44,605	27,879	169	415	157
Apr.	44,394	827	324	..	17	100	..	45,662	19,459	165	633	99
May	46,440	1,230	181	..	3	100	..	47,954	27,556	143	616	117
June	48,275	1,235	115	..	8	50	..	49,683	22,729	128	553	27
July	40,217	1,064	210	35	4	..	..	41,530	44,290	107	561	55
Aug.	31,971	1,022	145	10	..	100	..	33,248	44,802	67	672	84
Sept.	27,583	912	308	30	2	..	..	28,835	47,352	75	420	39
Oct.	33,788	755	740	..	15	..	..	35,298	43,016	25	477	33
Nov.	35,070	617	516	30	..	..	..	36,233	42,448	57	505	25
Dec.	28,348	440	372	..	40	..	..	29,200	42,099	74	291	..
Total, 12 mos., 1934.....*tons*	454,442	10,726	3,661	166	89	400	..	469,484	.....	1,153	6,443	668
Total, 12 mos., 1933.....*tons*	398,285	8,874	4,384	43	29	..	..	.....	411,615	1,287	8,348	159

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934		
Jan.	2,521,961	$239,054
Feb.	1,983,210	193,732
Mar.	2,539,425	257,545
Apr.	2,988,131	321,390
May	3,151,740	368,642
June	3,266,318	421,317
July	2,757,167	385,733
Aug.	2,617,829	369,335
Sept.	2,097,385	312,967
Oct.	2,065,490	282,503
Nov.	1,986,245	296,447

Data from United States Department of Commerce, Washington, D. C.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	October, 1934		Ten Months Ended October, 1934		November, 1934		Eleven Months Ended November, 1934	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Crude rubber	63,431,032	$8,203,447	885,709,101	$82,454,069	81,369,202	$10,470,076	967,078,303	$92,924,145
Liquid latex	2,065,490	282,503	25,988,656	3,152,218	1,986,245	296,447	27,974,901	3,448,665
Jelutong or pontianak	622,886	48,287	9,999,012	850,901	742,686	60,904	10,741,698	911,805
Balata	30,966	2,797	2,213,219	415,582	134,619	20,169	2,347,838	435,751
Gutta percha	672,582	90,975	3,173,673	351,539	514,813	61,486	3,688,486	413,025
Guayule	.....	.....	891,700	75,349	.....	.....	891,700	75,349
Scrap and reclaimed, etc.	672,614	6,709	8,315,884	74,595	740,333	6,639	9,056,217	81,234
Totals	67,495,570	$8,634,718	936,291,245	$87,374,253	85,487,898	$10,915,721	1,021,779,143	$98,289,974
Chicle, crude .....*Free*	72,269	$17,731	4,637,430	$1,036,603	931,201	$247,551	5,568,631	$1,284,154
MANUFACTURED—*Dutiable*								
Rubber soled footwear with fabric uppers..*pairs*	121,522	$10,441	1,190,058	$284,945	55,430	$13,212	1,245,488	$298,157
Rubber toys	.....	22,944	.....	235,047	.....	22,155	.....	257,202	
Druggists' sundries, n. e. s.	.....	4,451	.....	66,803	.....	3,792	.....	70,595
Combs, hard rubber.....*number*	40,896	2,212	1,064,846	50,428	158,392	7,197	1,223,238	57,625
Golf balls .....*number*	15,600	3,202	450,098	109,629	5,940	1,082	456,038	110,711
Tennis and other rubber balls.....*number*	54,760	4,148	1,828,948	138,693	208,581	5,581	2,037,529	144,274
Tires .....*number*	626	677	6,840	17,056	2,830	1,919	9,670	18,975
Other rubber manufactures	.....	48,988	.....	399,724	.....	43,184	.....	442,908
Totals	.....	$97,063	.....	$1,302,325	.....	$98,122	.....	$1,400,447

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES								
Crude rubber	4,293,284	$577,702	48,406,547	$5,158,605	2,755,570	$327,672	51,478,911	$5,529,329
Balata	8,056	2,541	131,483	38,371	21,242	6,493	152,725	44,864
Guayule	.....	.....	16,800	1,419	.....	.....	16,800	1,419
Gutta percha, rubber substitutes, and scrap...	2,030	325	3,972	1,031	20	14	3,992	1,045
Rubber manufactures	.....	671	.....	17,004	.....	794	.....	17,798
Totals	.....	$581,239	.....	$5,216,430	.....	$334,973	.....	$5,594,455

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES								
Reclaimed	797,094	$37,412	9,200,284	$431,653	838,786	$36,281	10,039,070	$467,934
Scrap	5,358,076	114,586	39,394,579	832,243	4,650,564	81,779	44,045,143	914,022
Rubberized automobile cloth.....*sq. yd.*	49,524	25,568	705,440	361,703	49,938	23,091	755,378	384,794
Other rubberized piece goods and hospital sheeting .....*sq. yd.*	77,768	33,526	619,749	277,861	104,267	39,796	724,016	317,657
Footwear								
Boots .....*pairs*	9,927	23,431	46,277	112,443	4,831	12,376	51,108	124,819
Shoes .....*pairs*	15,529	7,316	169,697	76,559	20,941	15,677	190,638	92,236
Canvas shoes with rubber soles.....*pairs*	28,853	14,248	234,189	145,900	14,535	10,027	248,834	155,927
Soles .....*doz. pairs*	2,282	4,298	29,326	47,326	3,881	6,799	33,207	54,125
Heels .....*doz. pairs*	35,251	18,123	307,858	164,723	41,165	22,485	349,023	187,208
Water bottles and fountain syringes...*number*	20,988	8,326	191,011	73,338	18,122	6,414	209,133	79,752
Gloves .....*doz. pairs*	3,700	8,703	48,612	103,360	4,050	10,250	52,662	113,610
Other druggists' sundries	.....	40,929	.....	305,604	.....	26,786	.....	332,390
Balloons .....*gross*	25,630	23,242	178,915	165,481	34,893	30,321	213,808	195,802
Toys and balls	.....	10,234	.....	43,556	.....	15,491	.....	59,047
Bathing caps .....*doz.*	6,567	9,116	88,514	154,546	2,217	3,658	90,731	158,204
Bands	12,816	4,485	219,793	72,844	21,182	7,332	240,975	80,176
Erasers	29,352	16,691	280,681	155,140	30,491	17,520	311,172	172,660
Hard rubber goods								
Electrical goods	146,498	12,525	1,056,201	106,889	122,444	11,754	1,178,645	118,643
Other goods	.....	10,425	.....	126,763	.....	10,758	.....	137,521
Tires								
Truck and bus casings.....*number*	27,531	460,633	264,818	4,167,713	23,044	402,539	287,862	4,570,252
Other automobile casings.....*number*	61,207	458,366	714,778	4,909,353	46,765	362,908	761,543	5,272,261
Tubes, auto .....*number*	65,022	81,127	672,843	747,297	47,476	59,437	720,319	806,734
Other casings and tubes.....*number*	2,525	7,150	42,250	109,646	2,790	10,200	45,040	119,846
Solid tires for automobiles and motor trucks .....*number*	575	15,850	7,884	188,979	800	21,786	8,684	210,765
Other solid tires	107,084	11,940	1,239,637	154,619	125,033	16,169	1,364,670	170,788
Tire sundries and repair materials.....	.....	28,487	.....	323,209	.....	30,958	.....	352,187
Rubber and friction tape	41,623	11,358	474,724	128,166	41,796	10,984	516,520	138,160
Belting	231,419	123,233	2,076,813	970,077	205,216	97,724	2,282,029	1,067,801
Hose	298,701	98,835	3,681,263	1,041,437	359,638	101,407	4,040,901	1,142,844
Packing	101,839	39,277	898,566	367,626	106,583	39,702	1,005,149	407,328
Thread	79,182	47,685	950,123	568,680	93,760	56,189	1,043,883	624,869
Other rubber manufactures.....	.....	95,798	.....	1,015,403	.....	116,708	.....	1,132,111
Totals	.....	$1,902,923	.....	$18,450,137	.....	$1,715,306	.....	$20,162,473

Classified Advertisements

Continued

SITUATIONS OPEN—Continued

CHEMIST: EXPERIENCED IN RUBBER COATED FABRICS. A knowledge of pyroxylin helpful, but not necessary. State age, experience, and salary expected. Address Box No. 460, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

"V" SHAPED RUBBER AND CANVAS DRIVING ROPES. SOLE buying agency for Great Britain required by old-established English belting firm with big connections among the largest factories. Prompt cash terms. Write fully stating full particulars and samples with special prices to THE W. T. LAMBOURNE CO., 5 Henrietta St., Covent Garden, London, England.

FOR SALE OR PARTY TO INVEST IN PLANT MANUFACTURing V-type fan belts for automobiles. Reasonable. Address Box No. 454, care of INDIA RUBBER WORLD.

FOR SALE: LAND, BUILDINGS, EQUIPMENT, AND GOOD WILL of a going business located in business district St. Louis, Missouri. Modernly equipped for the manufacture of friction tape, backing, and combining business. Full details on application. Address Box No. 465, care of INDIA RUBBER WORLD.

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Important European concern, producing complete line of sueded fabrics and paper, is open to make its formulae and manufacturing experience available to suitable company in the United States on basis of license agreement. Representative at present in New York. Applications from principals only with information concerning manufacturing and marketing facilities. Address Box No. 464, care of INDIA RUBBER WORLD.

MISCELLANEOUS

WE WILL PAY 25¢ EACH FOR PERFECT COPIES OF THE FOLlowing numbers of INDIA RUBBER WORLD: January, June, July, August, September, October, all 1934. INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.

(*Advertisements continued on page* 83)

Rubber Goods Production Statistics

		1934	1933
TIRES AND TUBES*		Oct.	Oct.
Pneumatic casings			
Production	thousands	3,188	2,743
Shipments, total	thousands	2,919	2,030
Domestic	thousands	2,834	1,943
Stocks, end of month	thousands	8,397	6,769
Solid and cushion tires			
Production	thousands	17	12
Shipments, total	thousands	15	11
Domestic	thousands	14	11
Stocks, end of month	thousands	35	26
Inner tubes			
Production	thousands	3,123	2,805
Shipments, total	thousands	2,609	2,141
Domestic	thousands	2,543	2,079
Stocks, end of month	thousands	7,907	6,265
Raw material consumed			
Fabrics	thous. of lbs.	13,169	11,116
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	thous. of lbs.	330	188
Rubber clothing, calendered			
Orders, net	no. of coats and sundries	38,625	23,526
Production	no. of coats and sundries	38,484	41,612
Rubber-proofed fabrics, production, total	thous. of yds.	5,279	3,740
Auto fabrics	thous. of yds.	804	317
Raincoat fabrics	thous. of yds.	2,813	2,393
Rubber flooring, shipments	thous. of sq. ft.	386	329
Rubber and canvas footwear			
Production, total	thous. of prs.	5,078	6,604
Tennis	thous. of prs.	1,201	1,711
Waterproof	thous. of prs.	3,877	4,893
Shipments, total	thous. of prs.	5,525	6,573
Tennis	thous. of prs.	790	746
Waterproof	thous. of prs.	4,735	5,826
Shipments, domestic, total	thous. of prs.	5,486	6,525
Tennis	thous. of prs.	758	719
Waterproof	thous. of prs.	4,727	5,806
Stocks, total, end of month	thous. of prs.	15,248	14,341
Tennis	thous. of prs.	6,085	5,483
Waterproof	thous. of prs.	9,163	8,853
Rubber heels			
Production	thous. of prs.	14,437	19,103
Shipments, total	thous. of prs.	16,889	14,157
Export	thous. of prs.	377	340
Repair trade	thous. of prs.	5,238	3,765
Shoe manufactures	thous. of prs.	11,273	10,052
Stocks, end of month	thous. of prs.	40,016	33,750
Rubber soles			
Production	thous. of prs.	3,239	4,244
Shipments, total	thous. of prs.	3,297	3,678
Export	thous. of prs.	13	9
Repair trade	thous. of prs.	584	333
Shoe manufactures	thous. of prs.	2,699	3,336
Stocks, end of month	thous. of prs.	4,656	4,286
Mechanical rubber goods, shipments			
Total	thous. of dollars	3,715	3,275
Belting	thous. of dollars	996	808
Hose	thous. of dollars	1,376	1,117
Other	thous. of dollars	1,343	1,350

*Data for 1934 are estimated to represent approximately 97% of the industry.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

London Stocks, November, 1934

	Landed Tons	Delivered Tons	Stocks, November 30 1934 Tons	1933 Tons	1932 Tons
LONDON					
Plantation	12,206	7,624	67,599	36,120	40,571
Other grades	33	38	57	19	35
LIVERPOOL					
Plantation	*4,779	*2,491	*60,106	*51,779	*55,617
Total tons, London and Liverpool	17,018	10,153	127,762	87,918	96,223

*Official returns from the recognized public warehouses.

World Rubber Shipments—Net Exports

	Long Tons—1934 Sept.	Oct.	Nov.	Dec.
British Malaya				
Gross exports	61,051	47,045	51,140	59,575
Imports	17,889	10,226	8,759	15,375
Net	43,162	36,819	42,381	44,200
Ceylon	6,555	6,544	6,756	*8,481
India and Burma	294	413	501	...
Sarawak	1,438	1,412	953	1,237
British N. Borneo	839	1,196	941	680
Siam	1,626	1,328	1,356	2,043
Java and Madura	5,722	5,970	7,621	...
Sumatra E. Coast	10,738	6,643	7,123	...
Other N. E. Indies	14,688	5,556	5,338	...
French Indo-China	*1,665	*1,413	*2,356	*2,956
Amazon Valley	764	840	1,017	...
Other America	...	...	...	...
Guayule (Mexico)	...	...	...	...
Africa	222	401	*200	*200
Totals	87,713	68,535	76,543	...

*Estimate. *Compiled by Leather-Rubber-Shoe Division, Department of Commerce, Washington, D. C.*

Imports by Customs Districts

	November, 1934 *Crude Rubber Pounds	Value	November, 1933 *Crude Rubber Pounds	Value
Massachusetts	7,174,015	$958,631	6,278,977	$439,757
New York	65,404,875	8,442,918	75,154,889	4,940,031
Philadelphia	2,765,613	365,085	2,583,258	147,275
Maryland	1,509,306	187,514	4,599,725	279,379
New Orleans	1,713,987	225,227	506,662	28,405
Los Angeles	4,516,823	548,653	4,050,117	261,366
San Francisco	158,550	22,400	434,534	30,733
Ohio	278	62	69,941	5,833
Colorado	112,000	16,033	.....	.....
Totals	83,355,447	$10,766,523	93,678,103	$6,132,779

*Crude rubber including latex dry rubber content.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
*8,024	Hard rubber comb castings	Kaunas, Lithuania
*8,107	Calender for rolling and vulcanizing rubber, and small presses for making packings and washers	Prague, Czechoslovakia
‡8,165	Surgical, dental, hospital, and medical goods	Santa Cruz de Tenerife, Canary Islands
†8,194	Sanitary and other rubber articles	Amsterdam, Netherlands
*8,221	Rubber bands	Clichy, France
†8,222	Druggists' sundries	Rio de Janeiro, Brazil
†8,246	Boots, shoes, toys, and other rubber goods	Santa Cruz de Tenerife, Canary Islands

*Purchase. †Agency. ‡Purchase and agency.

World Rubber Absorption—Net Imports

	Long Tons—1934 Sept.	Oct.	Nov.	Dec.
CONSUMPTION				
United States	30,693	32,052	35,234	37,074
United Kingdom	3,492	10,929	9,007	*8,900
NET IMPORTS				
Australia	743	798	516	...
Austria	199	233	*225	...
Belgium	501	693	*700	...
Canada	2,770	3,043	1,568	...
Czechoslovakia	477	254	215	...
Denmark	232	188	250	...
Finland	197	86	176	...
France	4,244	3,424	3,176	...
Germany	2,607	2,148	3,425	...
Italy	1,486	1,296	*1,300	...
Japan	7,346	7,227	*7,000	...
Netherlands	339	447	187	...
Norway	89	40	86	...
Russia	4,487	*4,000	*4,000	...
Spain	465	675	*650	...
Sweden	462	499	870	...
Switzerland	89	181	159	...
Others	2,250	2,250	2,250	2,250
Totals	63,168	70,463	70,994	...
Minus United States (Cons.)	30,693	32,052	35,234	37,074
Total foreign	32,475	38,411	35,760	...

*Estimate to complete table. *Compiled by Leather-Rubber-Shoe Division, Department of Commerce, Washington, D. C.*

U. S. Imports of Balata by Countries

	1930 Pounds	Dollars	1931 Pounds	Dollars
Brazil	354,774	118,586	1,609,698	213,868
British Guiana	70,584	36,329	111,973	48,477
Colombia	94,075	32,628	47,131	12,017
Panama	620	219	2,794	625
Peru	45,653	12,630	741,614	83,537
Surinam	227,722	104,097	40,086	16,109
United Kingdom	72,580	37,686	46,544	14,625
Venezuela	233,555	73,579	95,953	19,104
	1932 Pounds	Dollars	1933 Pounds	Dollars
Brazil	874,923	81,566	1,310,450	209,442
British Guiana	80,423	15,860	35,371	7,845
Colombia	3,942	347	23,007	3,804
Panama	....	....	3,147	474
Peru	434,347	21,749	147,063	18,864
Surinam	42,644	8,220	*493,586	506,942
United Kingdom	89,209	10,440	40,947	5,024
Venezuela	59,279	9,221	40,478	5,309
Netherlands	....	....	†1,621,671	1,504,165

*Including 489,006 pounds valued at $506,022, imported August, 1933.
†All imported in June, 1933.